No. 98-830

IN THE

Supreme Court of the United States

OCTOBER TERM, 1998

AMOCO PRODUCTION COMPANY, on behalf of itself and the class it represents,*

Petitioners,

v.

SOUTHERN UTE INDIAN TRIBE,

and

BRUCE BABBITT, Secretary of the United States Department of Interior, *et al.*,

Respondents.

On Writ of Certiorari to the United States Court of Appeals for the Tenth Circuit

JOINT APPENDIX
VOLUME I

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PETITION FOR CERTIORARI FILED: NOVEMBER 18, 1998
CERTIORARI GRANTED: JANUARY 22, 1999
ORDER GRANTING CERTIORARI AMENDED: JANUARY 29, 1999

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Rollin T. Chamberlin, *Notes on Explosive Mine Gases and Dust,* U.S.G.S. Bulletin 383, H.R. Doc. No. 1538, 60th Cong., 2d Sess. (1909) 415

Papers on the Conservation of Mineral Resources, U.S.G.S. Bulletin 394, H.R. Doc. No. 1554, 60th Cong., 2d Sess. (1909) 473

Cassius A. Fisher, *Depth and Minimum Thickness of Beds as Limiting Factors in Valuation reprinted in The Valuation of Public Coal Lands,* U.S.G.S. Bulletin 424, H.R. Doc. No. 502, 61st Cong., 2d Sess. (1910) 505

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Phillip J. Wilson and J.H. Wells, *Coal, Coke, and Coal Chemicals*, Chemical Engineering Series (1950) 527

Harry Perry, *The Gasification of Coal*, 230 *Scientific American*, No. 3 (Mar. 1974) 530

Robert A. Myers, *Coal Handbook* (1981) 543

William F. Clark and Tom Hemler, *Completing, Equipping, and Operating Fruitland Formation Coal-Bed Methane Wells in the San Juan Basin, New Mexico and Colorado reprinted in* James E. Fasset, *Geology and Coal-Bed Methane Resources of the Northern San Juan Basin, Colorado and New Mexico*, Rocky Mtn. Ass'n of Geologists (1988) 553

Jeffrey R. Levine, *Coal Composition, as Related to the Mode of Occurrence of "Coalbed Methane"* (1992) 579

NOTICE

The following documents have been omitted in the printing of this Joint Appendix. They are reproduced in the Appendix to the Petition For A Writ Of Certiorari on the pages indicated below:

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B. Opinion of the Court of Appeals (Panel) 52a

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G. *Rights to Coalbed Methane Under an Oil & Gas Lease for Lands in the Jicarilla Apache Reservation*, 98 Interior Dec. 59 (1990) 160a

H. Department of Interior, Department Manual 209 DM 178a

I. Map of Major U.S. Coalbed Methane Resources.. 181a

The following additional documents have also been omitted in the printing of this Joint Appendix. They are reproduced in the Appendix to the Respondent Southern Ute Indian Tribe's Brief In Opposition on the pages indicated below:

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Bureau of Mines, Bulletin 65 (1913) (cover page).. 9a

Bureau of Mines, Bulletin 65, Plate I (map)..... 10a

UNITED STATES DISTRICT COURT
DISTRICT OF COLORADO

Case 1:91cv02273

SOUTHERN UTE INDIAN TRIBE,
Plaintiff,

v.

AMOCO PRODUCTION CO., *et al.*,
Defendants.

DOCKET ENTRIES

Sub #	Date	Description
1	12/31/91	COMPLAINT (Summons(es) issued) (ns)
—	12/31/91	FILING FEE PAID: on 12/31/91 in the amount of $ 120.00, receipt # 139487. (ns)
2	1/16/92	RETURN OF SERVICE of Summons and Complaint upon defendant Jack Carmack on 1/13/92 (sh) [Entry date 01/17/92]
3	1/16/92	RETURN OF SERVICE of Summons and Complaint upon defendant Louis M. Cummins on 1/13/92 (sh) [Entry date 01/17/92]
4	2/3/92	RETURN OF SERVICE (typed on back of Summons that service was by Certified Mail) of Summons and Complaint upon defendant Manuel Lujan Jr. on 1/13/92 (sh) [Entry date 02/04/92]
6	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Union TX Petroleum on 1/23/92, by hand delivery to Rita Aldridge, Senior Adm. Clerk. (sh) [Entry date 02/04/92]

Sub #	Date	Description
7	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Williams Production on 1/23/92 by hand delivery to Barbara Sena at the Corporation Company. (sh) [Entry date 02/04/92]
8	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Richmond Petroleum on 1/23/92 by hand delivery to Barbara Sena at The Corporation Co. (sh) [Entry date 02/04/92]
9	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Palo Petroleum, Inc. on 1/23/92 by hand delivery to Barbara Sena at The Corporation Co. (sh) [Entry date 02/04/92]
10	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Pablo Operating Co on 1/27/92 by hand deliver to Bruce Heller. (sh) [Entry date 02/04/92]
11	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Northwest Pipeline on 1/23/92 by hand delivery to Barbara Sena at The Corporation Co. (sh) [Entry date 02/04/92]
12	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Mobil Oil Corp on 1/23/92 by hand delivery to Sherri McNabb. (sh) [Entry date 02/04/92]
13	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Meridian Oil, Inc. on 1/23/92 by hand delivery to Barbara Sena at the Corporation Co. (sh) [Entry date 02/04/92]
14	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant McKenzie Methane on 1/23/92 by hand delivery to Barbara Sena at The Corporation Co. (sh) [Entry date 02/04/92]

Sub #	Date	Description
15	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Markwest Energy Prt on 1/23/92 by hand delivery to Reg. Agent David Padgett. (sh) [Entry date 02/04/92]
16	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant JM Huber Corporation on 1/23/92 by hand delivery to Reg. Agent Barbara Sena. (sh) [Entry date 02/04/92]
17	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Fuel Resources Dev on 1/23/92 by hand deliver to Reg. Agent Debbie Artzer. (sh) [Entry date 02/04/92]
18	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Conoco, Inc. on 1/23/92 by hand delivery to Reg. Agent Barbara Sena. (sh) [Entry date 02/04/92]
19	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Amax Oil & Gas, Inc. on 1/23/92 by hand delivery to Reg. Agent Barbara Sena. (sh) [Entry date 02/04/92]
20	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Shareholders of Hondo Oil & Gas Co on 1/23/92 by hand delivery to Barbara Sena, Reg. Agent. (sh) [Entry date 02/04/92]
21	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Phillips Petroleum on 1/23/92 by hand delivery to the

Sub #	Date	Description
		Reg. Agent, Burt Plender. (sh) [Entry date 02/04/92]
22	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant North Central Oil on 1/23/92 by hand delivery to their Reg. Agent, Barbara Sena. (sh) [Entry date 02/04/92]
23	2/3/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Laura Belle Aspaas mailed on 1/21/92; signed Laura Belle Aspaas (sh) [Entry date 02/04/92]
24	2/3/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Helen Ruth Aspaas mailed on 1/22/92; signed Helen Ruth Aspaas (sh) [Entry date 02/04/92]
25	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Natl Coop Refinery on 1/23/92 by hand delivery to Reg. Agent Barbara Sena. (sh) [Entry date 02/04/92]
26	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Delos Cy Jamison on 1/8/92 by Certified Mail upon Attorney General in Washington. (sh) [Entry date 02/04/92]
27	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Delos Cy Jamison on 1/16/92 by leaving with U.S. Attorney. (sh) [Entry date 02/04/92]
5	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Manuel Lujan Jr. on 1/16/92 by leaving with U.S. Attorney. (sh) [Entry date 02/04/92]
28	2/3/92	RETURN OF SERVICE (By Certified Mail—Receipt returned 1/14/92) of Summons and Complaint upon defendant DOI on 1/8/92 (sh) [Entry date 02/04/92]

Sub #	Date	Description
28	2/3/92	RETURN OF SERVICE (By Certified Mail—Return receipt rec'd 1/13/92) of Summons and Complaint upon defendant DOI on 1/13/92 by mailing to the Attorney General in Washington. (sh) [Entry date 02/04/92]
28	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant DOI on 1/16/92 by hand delivery to U.S. Attorney's Office. (sh) [Entry date 02/04/92]
29	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant BIA (by Certified Mail—Return Receipt received on 1/13/92) (sh) [Entry date 02/04/92]
29	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant BIA on 1/8/92 (by certified Mail to Attorney General in Washington—return receipt rec'd 1/13/92). (sh) [Entry date 02/04/92]
29	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant BIA on 1/16/92 by hand delivery to U.S. Attorney's office. (sh) [Entry date 02/04/92]
30	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Eddie F. Brown on 1/8/92 (by Certified Mail—return receipt rec'd 1/14/92) (sh) [Entry date 02/04/92]
30	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Eddie F. Brown on 1/8/92 by Certified Mail upon Attorney General in Washington—return receipt rec'd 1/13/92. (sh) [Entry date 02/04/92]

Sub #	Date	Description
30	2/3/92	RETURN OF SERVICE of Summons and Complaint upon defendant Eddie F. Brown on 1/16/92 by hand delivery to United States Attorney's office. (sh) [Entry date 02/04/92]
31	2/6/92	Copy of LETTER to Plf's counsel from defendant Phillips Petroleum's counsel re extension of time to 3/4/92 in which to answer or otherwise respond to the complaint. (sh) [Entry date 02/07/92]
32	2/6/92	MOTION by defendant McKenzie Methane to extend time to answer plf's complaint to 3/3/92 (sh) [Entry date 02/07/92]
33	2/7/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Carla M. Aspaas mailed on 1/22/92; signed by Carla M. Aspaas Foland on 1/27/92. (sh)
34	2/7/92	RETURN OF SERVICE of Summons and Complaint upon defendant Minerals Mgt Service by Certified Mail sent on 1/8/92—no return receipt received. (sh) [Edit date 02/07/92]
34	2/7/92	RETURN OF SERVICE of Summons and Complaint upon Attorney General for defendant Minerals Mgt Service by Certified Mail on 1/8/92—no return receipt card received. (sh)
34	2/7/92	RETURN OF SERVICE of Summons and Complaint upon U.S. Attorney's Office for defendant Minerals Mgt Service by hand delivery to Linda Blan on 1/16/92 (sh)
35	2/7/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Eric K. Aspaas mailed on 1/22/92; signed by Eric K. Aspaas on 1/28/92. (sh)

Sub #	Date	Description
36	2/7/92	RETURN OF SERVICE of Summons and Complaint upon defendant Scott S. Sewell, Director of Minerals Mgmt. Service by Certified Mail on 1/8/92—no return receipt received. (sh)
36	2/7/92	RETURN OF SERVICE of Summons and Complaint upon defendant Scott S. Sewell, Director of Minerals Mgmt. Service by Certified Mail to Attorney General in Washington D.C. on 1/8/92—no return receipt received. (sh)
36	2/7/92	RETURN OF SERVICE of Summons and Complaint upon defendant Scott S. Sewell, Director of Minerals Mgmt. Service by hand delivery to the U.S. Attorney's office on 1/16/92, signed by Linda Blan (sh)
37	2/7/92	RETURN OF SERVICE of Summons and Complaint upon defendant BLM by Certified Mail sent on 1/8/92—no return receipt received. (sh)
37	2/7/92	RETURN OF SERVICE of Summons and Complaint upon defendant BLM by Certified Mail to Attorney General on 1/8/92—no return receipt received. (sh)
37	2/7/92	RETURN OF SERVICE of Summons and Complaint upon defendant BLM by hand delivery to U.S. Attorney's office on 1/16/92, signed by Linda Blan (sh)
38	2/10/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to extend time to answer plf's complaint to 3/3/92 [32-1] (cc: all counsel); entry date: 2/10/92 (sh)
39	2/10/92	MOTION by defendant Markwest Energy Prt to extend time to answer Complaint (sh)

Sub #	Date	Description
40	2/10/92	LETTER to court from James P. Graham, President of defendant Palo Petroleum, Inc. asking for time to 3/3/92 in which to answer Plf's Complaint. (sh)
41	2/10/92	MINUTE ORDER: by Judge Lewis T. Babock granting Markwest Energy Partners, Ltd's motion to extend time to 3/3/92 to answer Complaint [39-1] (cc: all counsel); entry date: 2/11/92 (sh) [Entry date 02/11/92]
42	2/10/92	MOTION by defendant Conoco, Inc. for attorney Thomas H. Burton, Jr. to appear pro hac vice (sh) [Entry date 02/11/92]
43	2/10/92	ANSWER by defendant Conoco, Inc. to complaint [1-1] (sh) [Entry date 02/11/92]
44	2/11/92	MOTION by defendant Hondo Oil & Gas Co to extend time to file responsive pleading (sh) [Entry date 02/12/92]
45	2/11/92	MOTION by defendant Richmond Petroleum to extend time to answer (sh) [Entry date 02/12/92]
46	2/11/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motion for attorney Thomas H. Burton, Jr. to appear pro hac vice [42-1] (cc: all counsel); entry date: 2/12/92 (sh) [Entry date 02/12/92]
47	2/11/92	ANSWER by defendant JM Huber Corporation to complaint [1-1] (sh) [Entry date 02/12/92]
48	2/11/92	MINUTE ORDER: by Judge Lewis T. Babcock striking answer [47-1]; striking motion to extend time to file responsive pleading [44-1] for failure by counsel to comply with Local Rule 301 (cc: all counsel); entry date 2/12/92 (sh) [Entry date 02/12/92]
49	2/12/92	Supplemental CERTIFICATE OF MAILING by defendant Conoco, Inc. re mailing of Answer of deft Conoco and Motion for Pro Hac Vice Admission of Out-of State Counsel (sh)
50	2/12/92	MOTION by defendant—Mobil Oil Corp to extend time to 3/3/92 to answer (sh)
51	2/12/92	MOTION by defendant Pablo Operating Co to extend time to answer or otherwise respond (sh) [Entry date 02/13/92]
52	2/12/92	MOTION by defendant Meridian Oil, Inc. to extend time to answer or otherwise respond (sh) [Entry date 02/13/92]
53	2/12/92	MOTION by defendant Fuel Resources Dev to extend time to file responsive pleadings (sh) [Entry date 02/13/92]
54	2/12/92	MOTION by defendant Natl Coop Refinery to extend time to file responsive pleadings (sh) [Entry date 02/13/92]
55	2/12/92	MOTION by defendant Bowen/Edwards Assoc to extend time to respond to complaint (sh) [Entry date 02/13/92]
56	2/13/92	MINUTE ORDER: by Judge Lewis T. Babcock striking Dft Bowen/Edwards Assoc. Inc.'s motion to extend time to respond to complaint [55-1]; a corporation cannot appear without counsel. (cc: all counsel); entry date: 2/14/92 (sh) [Entry date 02/14/92]
57	2/13/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motions to extend time to answer or otherwise respond by Dft. Mer-

Sub #	Date	Description
		idian Oil [52-1] to 3/3/92; by Dft. Pablo Operating Co. [51-1] to 3/7/92; by Dft. National Cooperative Refinery Assoc. [54-1] to 3/3/92; by Fuel Resources Development [53-1] to 3/3/92; by Mobil Oil [50-1] to 3/3/92; by Richmond Petroleum, Inc. [45-1] to 3/3/92. (cc: all counsel); entry date: 2/14/92 (sh) [Entry date 02/14/92]
58	2/18/92	ATTORNEY APPEARANCE for defendant Northwest Pipeline, defendant Williams Production by Mark C. Moench (sh)
59	2/18/92	MOTION by defendant Northwest Pipeline, defendant Williams Production to extend time to 3/3/92 to file an answer or other responsive pleading (sh)
60	2/18/92	ORDER by Judge Lewis T. Babcock granting motion to extend time to 3/3/92 to file an answer or other responsive pleading [59--1] (cc: all counsel); entry date: 2/18/92 (sh)
61	2/20/92	RETURN OF SERVICE of Summons and Complaint upon defendant Tiffany Gas Company on 2/12/92 by hand deliver to J.R. Kroeger, agent. (sh) [Entry date 02/21/92]
62	2/20/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Rowland Carmack mailed on 1/21/92; signed by W. Rowland Carmack on 2/11/92. (sh) [Entry date 02/21/92]
63	2/20/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Bowen/Edwards Assoc mailed on 1/21/92; signed by J. Keith Edwards, President, on 2/11/92. (sh) [Entry date 02/21/92]

Sub #	Date	Description
64	2/20/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Amoco Production Co mailed on 1/21/92; signed by David Brody, Attorney for Amoco Production Co. on 2/10/92. (sh) [Entry date 02/21/92]
65	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Anthony F. Zarlengo on 2/14/92 (sh) [Edit date 02/24/92]
66	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Anthony H. Veto on 2/12/92 (sh) [Edit date 02/24/92]
67	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Frederick Petrocco on 2/15/92 (sh) [Edit date 02/24/92]
68	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Clara Onofrio on 2/15/92 by hand delivery to Frederick Petrocco, personally, for his Mother, Clara Onofrio. (sh) [Edit date 02/24/92]
69	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Edwin L. McKelvey on 2/15/92 (sh)
70	2/24/92	RETURN OF SERVICE of Summons and Complaint upon (deceased) defendant Frederick E. Dickerson on 2/16/92 by hand delivery to Martha Dickerson, his wife. (sh)
71	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Dorothy A. Corgin on 2/16/92 (sh)
72	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Colo Natl Bk Longmnt, as Conservator of the Estate of

Sub #	Date	Description
		Gladys N. Frazzini, deceased, on 2/13/92 by hand delivery to Janet Pearson, Vice President of the Bank. (sh)
73	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Colo Natl Bk Denver, as Trustee of the George Veto Trust, on 2/12/92 by hand delivery to Ronald M. Wilson, as Assistant Vice President of the Bank. (sh)
74	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Heirs of Horace Buchanan on 2/15/92 by hand delivery to Helen Leonardelli. (sh)
75	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Heirs of Horace F. Buchanan on 2/15/92 by hand delivery to Helen Leonardelli, Mother of Joel E. Buchanan. (sh)
76	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Maxwell (aka Maxine) C. Anderson on 2/17/92 (sh)
77	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Fidel Lucero on 2/17/92 (sh)
78	2/24/92	RETURN OF SERVICE of Summons and Complaint upon defendant Robert Galbasin on 2/14/92—Deft refused to accept service into his hands. Summons and Complaint were left on the premises with the full knowledge of Deft. (sh)
79	2/24/92	MOTION by defendant Louis M. Cummins to extend time to answer complaint (sh)
80	2/24/92	MOTION by defendant Tiffany Gas Company to extend time to answer or file other responsive pleading to complaint (sh)

Sub #	Date	Description
81	2/24/92	MOTION by defendant Anthony F. Zarlengo (pro se) to extend time to answer Plf's Complaint (sh)
82	2/24/92	ATTORNEY APPEARANCE for defendant Phillips Petroleum by George M. Paulson Jr. (sh)
83	2/24/92	MOTION by defendant Phillips Petroleum to extend time to answer or otherwise plead (sh)
84	2/24/92	ORDER by Judge Lewis T. Babcock granting Tiffany Gas Co.'s motion to extend time to 3/23/92 to answer or file other responsive pleading to complaint [80-1] (cc: all counsel); entry date: 2/25/92 (sh) [Entry date 02/25/92]
85	2/24/92	ORDER by Judge Lewis T. Babcock granting Anthony Zarlengo's motion to extend time to 4/5/92 to answer Plf's Complaint [81-1] (cc: all counsel); entry date: 2/25/92 (sh) [Entry date 02/25/92]
86	2/24/92	ORDER by Judge Lewis T. Babcock granting Phillips Petreleum's motion to extend time to 3/4/92 to answer or otherwise plead to Plf's Complaint [83-1] (cc: all counsel); entry date: 2/25/92 (sh) [Entry date 02/25/92]
87	2/24/92	MINUTE ORDER: by Judge Lewis T. Babcock denying without prejudice Louis M. Cummins' motion to extend time to answer complaint [79-1] for failure to comply with Local Rule 402 C. (cc: all counsel); entry date: 2/25/92 (sh) [Entry date 02/25/92]
88	2/28/92	ANSWER by defendant JM Huber Corporation to complaint [1-1] (sh)

Sub #	Date	Description
89	3/2/92	RETURN OF SERVICE of Summons and Complaint upon defendant Anna Carleo Tomeo on 2/17/92 (sh)
90	3/2/92	RETURN OF SERVICE of Summons and Complaint upon defendant Ernest Tomeo on 2/17/92 by hand delivery to Anna Carleo Tomeo, his wife. (sh)
91	3/2/92	MOTION by defendant Hondo Oil & Gas Co, defendant Palo Petroleum, Inc. for attorney James Bruce to appear pro hac vice (sh)
92	3/2/92	MOTION by defendant Palo Petroleum, Inc. to extend time to 3/23/92 to answer/respond to complaint. (sh)
93	3/2/92	MOTION by defendant Hondo Oil & Gas to extend time to answer/file responsive pleading to Complaint (sh)
94	3/2/92	MOTION by defendant McKenzie Methane to extend time to 3/23/92 to answer Complaint (sh)
95	3/2/92	ANSWER by defendant Amoco Production Co to complaint [1-1] (sh)
96	3/2/92	MOTION by defendant Northwest Pipeline, defendant Williams Production for attorney Teresa Silcox to appear pro hac vice (sh)
97	3/2/92	MOTION by defendant Northwest Pipeline, defendant Williams Production to withdraw attorney Mark C. Moench of Salt Lake City. (sh) [Entry date 03/03/92]
98	3/2/92	ANSWER by defendant Northwest Pipeline, defendant Williams Production to complaint [1-1] (sh) [Entry date 03/03/92]

Sub #	Date	Description
99	3/3/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to extend time to 3/23/92 to answer Complaint [94-1] (cc: all counsel) ; entry date: 3/3/92 (yk)
100	3/3/92	ORDER by Judge Lewis T. Babcock granting motion for attorney James Bruce to appear pro hac vice [91-1] (cc: all counsel) ; entry date: 3/3/92 (yk)
101	3/3/92	ORDER by Judge Lewis T. Babcock granting motion to extend time to answer/file responsive pleading to Complaint [93-1] to 3/3/92 (cc: all counsel) ; entry date: 3/3/92 (yk)
102	3/3/92	ORDER by Judge Lewis T. Babcock granting motion to extend time to 3/23/92 to answer/respond to complaint. [92-1] (cc: all counsel) ; entry date: 3/3/92 (yk)
103	3/3/92	ANSWER by defendant Markwest Energy Prt complaint [1-1] (yk)
104	3/3/92	MOTION by defendant - Mobil Oil Corp for attorney Larry Whyte and R. Dennis Ickes to appear pro hac vice (yk)
105	3/3/92	ANSWER by defendant Richmond Petroleum complaint [1-1] (yk)
106	3/3/92	ANSWER by defendant - Mobil Oil Corp complaint [1-1] (yk)
107	3/3/92	ANSWER by defendant Natl Coop Refinery complaint [1-1] (yk)
108	3/3/92	ANSWER by defendant Fuel Resources Dev complaint [1-1] (yk)
109	3/3/92	Renewal of MOTION by defendant Louis M. Cummins to extend time to answer complaint. (sh) [Entry date 03/04/92]

Sub #	Date	Description
110	3/3/92	Acknowledgment of RECEIPT of a copy of Motion for Extension, signed by Louis M. Cummins. (sh) [Entry date 03/04/92]
111	3/3/92	MOTION by defendant Meridian Oil, Inc., defendant Amax Oil & Gas, Inc. for more definite statement, or to dismiss for failure to state a claim. (sh) [Entry date 03/04/92]
112	3/3/92	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co for hearing (to set scheduling conf), for consideration of proposed case management order no. 1, and to stay responses of individuals to the complaint; (the attached proposed Case Management Order No. 1 was sent to the Judge's Chambers). (sh) [Entry date 03/04/92] [Edit date 03/04/92]
113	3/3/92	ANSWER by defendant Meridian Oil, Inc. to complaint [1-1] (sh) [Entry date 03/04/92]
114	3/3/92	ANSWER by defendant Amax Oil & Gas, Inc. to complaint [1-1] (sh) [Entry date 03/04/92]
115	3/3/92	MOTION by defendant Amax Oil & Gas, Inc. to vacate default, and to extend time to 3/3/92 to answer or otherwise respond to complaint. (sh) [Entry date 03/04/92]
116	3/3/92	MOTION by defendant Colo Natl Bk Denver, defendant Colo Natl Bk Longmnt to extend time to answer/otherwise respond to Plf's Complaint. (sh) [Entry date 03/04/92]
117	3/4/92	MOTION by defendant Bowen/Edwards Assoc to extend time to answer/respond to Complaint. (sh)

Sub #	Date	Description
118	3/4/92	ANSWER by defendant Phillips Petroleum to complaint [1-1] (sh) [Entry date 03/05/92]
119	3/4/92	MOTION by defendant Phillips Petroleum for joinder in joint motion of Plf and Deft Amoco Production for scheduling conf, consideration of proposed case management order no. 1, and for limited stay of responses to the complaint. (sh) [Entry date 03/05/92]
120	3/4/92	ORDER by Judge Lewis T. Babcock granting motion for attorney Larry Whyte and R. Dennis Ickes to appear pro hac vice [104-1] (cc: all counsel); entry date: 3/5/92 (sh) [Entry date 03/05/92]
121	3/4/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to withdraw attorney Mark C. Moench of Salt Lake City [97-1] for Williams Production, for Northwest Pipeline; granting Colorado National Bank-Denver and Colorado National Bank-Longmont's motion to extend time to 3/23/92 to answer/otherwise respond to Plf's Complaint [116-1]; granting Louis Cummins' renewal of motion to extend time to 3/23/92 to answer complaint [109-1]; granting motion for attorney Teresa Silcox to appear pro hac vice [96-1]. (cc: all counsel); entry date: 3/5/92 (sh) [Entry date 03/05/92]
122	3/5/92	JOINDER by defendant Markwest Energy Prt re motion for hearing (to set scheduling conf) [112-1], re motion to stay responses of individuals to the complaint [112-2] (sh)
123	3/6/92	ORDER by Judge Lewis T. Babcock granting motion to extend time to 3/3/92 to

Sub #	Date	Description
		answer/respond to Complaint. [117-1] (cc: all counsel); entry date: 3/6/92 (sh)
124	3/6/92	MINUTE ORDER: by Judge Lewis T. Babcock finding Amax Oil and Gas' motion to vacate default [115-1] moot, since default has not been entered; granting Amax Oil and Gas' motion to extend time to 3/3/92 to answer or otherwise respond to complaint [115-2] (cc: all counsel); entry date: 3/6/92 (sh)
125	3/6/92	ANSWER by defendant Pablo Operating Co to complaint [1-1] (sh)
126	3/6/92	MOTION by defendant Pablo Operating Co for more definite statement, or to dismiss for failure to state a claim. (sh)
127	3/6/92	MOTION by defendant Edwin L. McKelvey to extend time to 3/26/92 to answer Complaint (sh) [Entry date 03/09/92]
128	3/6/92	MOTION by defendant Meridian Oil, Inc. for leave to respond by 3/20/92 to Joint Motion of Plf and Deft Amoco Prod Co. (sh) [Entry date 03/09/92]
129	3/9/92	RESPONSE by plaintiff Southern Ute Indian to motion to withdraw attorney Mark C. Moench of Salt Lake City [97-1]; motion for attorney Teresa Silcox to appear pro hac vice [96-1] (sh)
130	3/9/92	MOTION by defendant Maxwell C. Anderson to extend time to answer complaint. (sh)
131	3/9/92	MOTION by defendant Robert Galbasin-pro se - to extend time to answer complaint. (sh)
132	3/9/92	ORDER by Judge Lewis T. Babcock granting Meridian Oil's motion for leave to

Sub #	Date	Description
		respond by 3/20/92 to Joint Motion of Plf and Deft Amoco Prod Co. [128-1] (cc: all counsel); entry date 3/10/92 (sh) [Entry date 03/10/92]
133	3/9/92	ORDER FOR RULE 16 CONFERENCE by Judge Lewis T. Babcock; rule 16 conference set for 9:00 a.m. on 4/24/92; the proposed Case Management Order No. 1 will be considered at that time; no further responses to the Complaint are required of any deft (other than the named oil company defts and the Federal Defts) until further order of court; no party shall initiate discovery without having first obtained court order, and any outstanding discovery proceedings are stayed until further court order. (c: all counsel) (sh) [Entry date 03/10/92]
134	3/9/92	MINUTE ORDER: by Judge Lewis T. Babcock granting Edwin L. McKelvey's motion to extend time to 3/26/92 to answer Complaint [127-1]. (cc: all counsel); entry date: 3/10/92 (sh) [Entry date 03/10/92]
135	3/10/92	RESPONSE (OPPOSITION) by defendant Conoco, Inc. to Joint motion for hearing (to set scheduling conf) [112-1], for consideration of Proposed Case Managment Order No. 1, and motion to stay responses of individuals to the complaint [112-2] (sh)
136	3/11/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant James M. Raymond mailed on 2/28/92; signed by James M. Raymond, individually and as Trustee for the Corinne Miller Gay Trust and Maydell Miller Mast Trust. (sh)

Sub #	Date	Description
137	3/11/92	ATTORNEY APPEARANCE for defendant DOI, defendant BIA, defendant BLM, defendant Minerals Mgt Service, defendant Eddie F. Brown, defendant Delos Cy Jamison, defendant Scott S. Sewell, defendant Manuel Lujan Jr. by William G. Pharo, Thornton Withers Field (sh) [Entry date 03/12/92]
138	3/11/92	MOTION by Federal defendants to extend time to 4/15/92 to answer Plf's Complaint (sh) [Entry date 03/12/92]
139	3/12/92	MINUTE ORDER: by Judge Lewis T. Babcock granting Deft Galbasin's motion to extend time to answer complaint [131-1]; granting Deft. Maxwell Anderson's motion to extend time to answer complaint [130-1]. (cc: all counsel); entry date 3/13/92 (sh) [Entry date 03/13/92]
140	3/13/92	JOINDER by defendant Turner Securities, defendant Louis M. Cummins, defendant Maxwell C. Anderson re Joint Motion motion for hearing (to set scheduling conf) [112-1], for consideration of proposed case management order no. 1, and for motion to stay responses of individuals to the complaint [112-2] (sh) [Entry date 03/16/92]
141	3/13/92	JOINDER by defendant Bowen/Edwards Assoc re Joint motion for hearing (to set scheduling conf) [112-1], for consideration of proposed case management order no. 1, and motion to stay responses of individuals to the complaint [112-2] (sh) [Entry date 03/16/92]
142	3/16/92	JOINDER by defendant—Mobil Oil Corp in support of motion for hearing (to set scheduling conf) [112-1], re motion to stay responses of individuals to the complaint [112-2] (sh) [Entry date 03/18/92]

Sub #	Date	Description
143	3/16/92	MOTION by plaintiff Southern Ute Indian for leave to respond to the motions for more definite statement or dismissal for failure to state a claim submitted by Amax, Meridian and Pablo. (sh) [Entry date 03/18/92]
144	3/16/92	RESPONSE by plaintiff Southern Ute Indian to Pablo's motion for more definite statement [126-1], motion to dismiss for failure to state a claim [126-2]; and response to Amax, Meridian's motion for more definite statement [111-1], motion to dismiss for failure to state a claim. [111-2] (sh) [Entry date 03/18/92]
145	3/16/92	ORDER by Judge Lewis T. Babcock granting Plf's motion for leave to respond to the motions for more definite statement or dismissal for failure to state a claim submitted by Amax, Meridian and Pablo. [143-1] (cc: all counsel); entry date: 3/18/92 (sh) [Entry date 03/18/92]
146	3/17/92	STATEMENT by defendant Anthony F. Zarlengo in support of Case Management Order No. 1 [112-1], [112-2]. (sh) [Entry date 03/18/92]
147	3/17/92	JOINDER by defendant North Central Oil re motion for hearing (to set scheduling conf) [112-1], consideration of Proposed Case Management Order No. 1, and motion to stay responses of individuals to the complaint [112-2]. (sh) [Entry date 03/18/92]
148	3/20/92	RESPONSE (Opposition) by defendant Meridian Oil, Inc. to motion for hearing (to set scheduling conf) [112-1], motion to stay responses of individuals to the complaint [112-2]. (sh) [Entry date 03/23/92]

Sub #	Date	Description
148	3/20/92	MOTION by defendant Meridian Oil, Inc. to vacate or modify Initial Scheduling Order. (sh) [Entry date 03/23/92]
149	3/20/92	MOTION by defendant McKenzie Methane to extend time to answer the Plf's Complaint to 4/13/92. (sh) [Entry date 03/23/92]
150	3/23/92	MINUTE ORDER: by Judge Lewis T. Babcock granting McKenzie Methane's motion to extend time to answer Plf's Complaint to 4/13/92. [149-1] (cc: all counsel); entry date 3/23/92 (sh)
151	3/23/92	Second MOTION by defendant Tiffany Gas Company to extend time to 5/6/92 to answer/otherwise respond to Complaint. (sh)
152	3/23/92	ANSWER by defendant Palo Petroleum, Inc. to Plf's complaint [1-1]. (sh)
153	3/23/92	JOINDER by defendant Palo Petroleum, Inc. re motion for hearing (to set scheduling conf) [112-1], re motion to stay responses of individuals to the complaint [112-2]. (sh)
154	3/23/92	ANSWER by defendant Bowen/Edwards Assoc. to Plf's complaint [1-1]. (sh) [Entry date 03/24/92]
155	3/23/92	MOTION by defendant Conoco, Inc. for leave of court to propound interrogs and document requests to plf. (sh) [Entry date 03/24/92]
156	3/24/92	CERTIFICATE of Mailing for Proposed Order Granting Conoco Inc's Motion for Leave of Court to Propound Interrogs and Document Requests of Plf. (sh)

Sub #	Date	Description
157	3/25/92	RESPONSE by plaintiff Southern Ute Indian to McKenzie Methane's motion to extend time to answer the Plf's Complaint to 4/13/92. [149-1] (sh)
158	3/26/92	MOTION by defendant Amax Oil & Gas, Inc., defendant Meridian Oil, Inc., defendant Pablo Operating Co for leave to file reply of Plf's Motion seeking leave to respond to the motions for more definite statement or dismissal for failure to state a claim submitted on behalf of Amax, Meridian and Pablo. (sh) [Entry date 03/27/92]
159	3/26/92	REPLY by defendant Amax Oil & Gas, Inc., defendant Meridian Oil, Inc., defendant Pablo Operating Co to Plf's response to Pablo's motion for more definite statement [126-1], motion to dismiss for failure to state a claim [126-2], and Meridian/Amax's motion for more definite statement [111-1], motion to dismiss for failure to state a claim. [111-2] (sh) [Entry date 03/27/92]
160	3/27/92	RETURN OF SERVICE of Summons and Complaint upon defendant Heirs of Horace Buchanan on 3/12/92, by hand delivery to Jay F. Buchanan. (sh)
161	3/30/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Charles Kettering mailed on 2/28/92; signed by Charles W. Kettering on 3/12/92. (sh)
162	3/30/92	ORDER by Judge Lewis T. Babcock granting motion for leave to file reply to Plf's Motion seeking leave to respond to the motions for more definite statement or dismissal for failure to state a claim submitted on behalf of Amax, Meridian and Pablo. [158-1] (cc: all counsel); entry date 3/30/92 (sh)

Sub #	Date	Description
163	3/30/92	ORDER by Judge Lewis T. Babcock granting Tiffany Gas Co.'s motion to extend time to 5/6/92 to answer/otherwise respond to Complaint. [151-1] (cc: all counsel); entry date: 3/30/92 (sh)
164	3/31/92	Opposition by defendant Meridian Oil, Inc. to Tribe and Amoco proposed order re: joint stipulated plan and schedule for discovery and re: motion for hearing (to set scheduling conf) [112-1] (yk) [Entry date 04/01/92]
165	3/31/92	MOTION by defendant Meridian Oil, Inc. for leave to file oppostion to proposed order re: stipulated plan and schedule for discovery (yk) [Entry date 04/01/92]
166	4/1/92	ORDER by Judge Lewis T. Babcock granting Meridian's motion for leave to file oppostion to proposed order re: stipulated plan and schedule for discovery [165-1]. (cc: all counsel); entry date 4/2/92 (sh) [Entry date 04/02/92]
167	4/3/92	MOTION by plaintiff Southern Ute Indian for leave to respond to Opposition of Defts to Joint Moiont and Motion of Deft Meridian Oil to Vacate or Modify Initial Scheduling Order. (sh) [Entry date 04/06/92]
168	4/3/92	REPLY by plaintiff Southern Ute Indian to Deft Meridian Oil's response to joint motion for hearing (to set scheduling conf) [112-1], motion to stay responses of individuals to the complaint [112-2]. (sh) [Entry date 04/06/92]
168	4/3/92	RESPONSE by plaintiff Southern Ute Indian to Meridian Oil's motion to vacate or modify Initial Scheduling Order [148-1]. (sh) [Entry date 04/06/92]

Sub #	Date	Description
169	4/3/92	REPLY by defendant Amoco Production Co to Opposition response of Deft Meridian Oil to joint motion for hearing (to set scheduling conf) [112-1], motion to stay responses of individuals to the complaint [112-2]. (sh) [Entry date 04/06/92]
169	4/3/92	RESPONSE by defendant Amoco Production Co to Meridian Oil's motion to vacate or modify Initial Scheduling Order [148-1]. (sh) [Entry date 04/06/92]
170	4/6/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Rita M. Adkins mailed on 2/27/92; signed by Rita M. Adkins on 3/25/92. (sh)
171	4/6/92	MOTION by plaintiff Southern Ute Indian for leave to respond to Deft Conoco, Inc.'s motion for leave of court to propound interrogs and document requests to plf. (sh)
172	4/6/92	RESPONSE by plaintiff Southern Ute Indian to Conoco's motion for leave of court to propound interrogs and document requests to plf [155-1]. (sh)
173	4/6/92	MOTION by plaintiff Southern Ute Indian to supplement Case Management Order No. 1. (sh)
174	4/8/92	MOTION by defendant Conoco, Inc. for leave to reply to plf Southern Ute response to def Conoco mtn incorporating legal authority for leve to propound interrogs and doc requests to plf (yk) [Entry date 04/09/92]
179	4/9/92	MOTION by defendant McKenzie Methane to extend time to 5/3/92 to answer plf's complaint. (sh) [Entry date 04/10/92]
180	4/9/92	ORDER by Judge Lewis T. Babcock referring case to Magistrate Judge Donald E. Abram for discovery and pretrial and set-

Sub #	Date	Description
		tlement. On 4/24/92 at 9:00 a.m. the court will consider the entry and terms of a case management order. (cc: to counsel) (sh) [Entry date 04/10/92]
175	4/10/92	ATTORNEY APPEARANCE for defendant JM Huber Corporation by Lon Abadie (yk)
176	4/10/92	RETURN OF SERVICE of Summons and Complaint upon Peter Turner, office manager of defendant Turner Securities on 4/3/92 (yk)
177	4/10/92	RETURN OF SERVICE of Summons and Complaint upon Susan Payne, daughter of defendant Harold F. Payne Jr. on 4/1/92 (yk)
178	4/10/92	RETURN OF SERVICE of Summons and Complaint upon Charles Onofrio, legal counsel for defendant Margaret Crow on 4/2/92 (yk)
181	4/10/92	MOTION by defendant Conoco, Inc. to submit objection in excess of page limitation. (sh) [Entry date 04/13/92]
182	4/10/92	OBJECTIONS by defendant Conoco, Inc. to Joint Motion of Plf/Amoco re motion for hearing (to set scheduling conf) [112-1], motion to stay responses of individuals to the complaint [112-2] and Case Management Order No. 1 re certification of this case as a class action and designation of any party as a class representative. (sh) [Entry date 04/13/92]
183	4/13/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Carbone Investment on 4/6/92 by hand delivery to John A. Carbone, Jr., Registered Agent. (sh)

Sub #	Date	Description
184	4/13/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE upon defendant Union TX Petroleum mailed on 3/27/92; signed by (name illegible), Associate Counsel on 3/31/92. (sh)
185	4/13/92	RETURN OF SERVICE of Summons and Complaint and several other documents upon defendant Tillie Flaks on 4/7/92, by hand delivery to Charles J. Jacobs, Esq., legal counsel for Tillie Flaks. (sh)
186	4/13/92	RETURN OF SERVICE of Summons and Complaint and several other documents upon defendant Minnie Flaks on 4/7/92 by hand delivery to Charles J. Jacobs, Esq., legal counsel for Minnie Flaks. (sh)
187	4/13/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE of defendant Sally M. Etterbeck mailed on 2/27/92; signed by Sally M. Etterbeck on 3/5/92. (sh)
188	4/13/92	RETURN OF SERVICE of Summons and Complaint and several other documents upon defendant John Crow Jr. on 4/2/92. (sh)
189	4/13/92	MINUTE ORDER: by Judge Lewis T. Babcock granting McKenzie Methane Corp's motion to extend time to 5/3/92 to answer plf's complaint [179-1]; denying Conoco's motion for leave to reply to plf Southern Ute response to def Conoco mtn incorporating legal authority for leave to propound interrogs and doc requests to plf [174-1]. (cc: all counsel); entry date 4/15/92 (sh) [Entry date 04/15/92]
190	4/14/92	OBJECTIONS by defendant Richmond Petroleum to Plf's motion to supplement Case Management Order No. 1 [173-1]. (sh) [Entry date 04/15/92]

Sub #	Date	Description
191	4/14/92	RESPONSE by defendant Fuel Resources Dev for Plf's/Amoco's Joint motion for hearing (to set scheduling conf) [112-1], motion to stay responses of individuals to the complaint [112-2]. (sh) [Entry date 04/15/92]
192	4/14/92	RESPONSE by Federal defendants to Plf/ Amoco's Joint motion for hearing (to set scheduling conf) [112-1], motion to stay responses of individuals to the complaint [112-2]. (sh) [Entry date 04/15/92]
193	4/14/92	MOTION by defendant Meridian Oil, Inc. to file objections to Proposed Case Management Order No. 1 to exceed page limitation. (sh) [Entry date 04/15/92]
194	4/14/92	OBJECTIONS by defendant Meridian Oil, Inc. to Proposed Case Management Order No. 1 which is part of the motion for hearing (to set scheduling conf) [112-1], motion to stay responses of individuals to the complaint [112-2]. (sh) [Entry date 04/15/92]
195	4/14/92	MOTION by defendant to extend time to 5/30/92 to answer Plf's Complaint. (sh) [Entry date 04/15/92]
196	4/16/92	MINUTE ORDER : by Magistrate Judge Donald E. Abram ; counsel directed to report to Mag. Abram's chambers for a status conf after completion of the Rule 16 conference scheduled before Judge Babcock 9:00 a.m. on 4/24/92. (cc: all counsel) ; entry date : 4/17/92 (sh) [Entry date 04/17/92]
197	4/17/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Thomas C. Romolo on 4/6/92. (sh)

Sub #	Date	Description
198	4/17/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Abel S. Gallegos on 4/9/92. (sh)
199	4/17/92	MINUTE ORDER : by Judge Lewis T. Babcock granting Meridian Oil's motion to file objections to Proposed Case Management Order No. 1 to exceed page limitation [193-1]. (cc: all counsel) ; entry date : 4/20/92 (sh) [Entry date 04/20/92]
200	4/20/92	MOTION by plaintiff Southern Ute Indian for leave to respond to Deft McKenzie Methane's req for extension of time. (sh) [Entry date 04/21/92]
201	4/20/92	RESPONSE by plaintiff Southern Ute Indian to McKenzie Methane's motion to extend time to 5/3/92 to answer plf's complaint [179-1]. (sh) [Entry date 04/21/92]
202	4/20/92	ANSWER by defendant Union TX Petroleum to Plf's complaint [1-1]. (sh) [Entry date 04/21/92]
203	4/20/92	MOTION by defendant Union TX Petroleum for more definite statement, or to dismiss for failure to state a claim. (sh) [Entry date 04/21/92]
204	4/20/92	STATEMENT—Joint Submission of Order Re: Joint Stipulated Plan and Schedule for Discovery by plaintiff Southern Ute Indian, defendant Amoco Production Co. (Exhibit A is the Proposed Order and has been sent to Judge Babcock's chambers for his signature.) (sh) [Entry date 04/21/92]
205	4/21/92	RESPONSE by defendant Amoco Production Co, to objections to proposed Case Management Order—responding to specific objections of Meridian Oil Co. [194-1], Fuel

Sub #	Date	Description
		Resources Response to Joint Motion [191-1], and Conoco's Objections [182-1]. (sh) [Entry date 04/22/92]
206	4/21/92	MINUTE ORDER : by Judge Lewis T. Babcock granting Plf's motion for leave to respond to Deft McKenzie Methane's req for extension of time [200-1]. (cc: all counsel) ; entry date : 4/22/92 (sh) [Entry date 04/22/92]
207	4/22/92	CERTIFICATE of Compliance by plaintiff Southern Ute Indian indicating compliance with Court's Initial Scheduling Order directing Plf to furnish copies of the Initial Scheduling Order, the proposed Case Management Order No. 1, the Joint Motion and the proposed Order Re: Joint Stipulated Plan and Schedule for Discovery to all defts. (sh) [Entry date 04/23/92]
208	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant William Kemp Clark on 4/14/92. (sh) [Entry date 04/23/92]
209	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Heirs of Kelly Cox (to Trustee for Kelly Cox Testamentary Trust) on 4/14/92. (sh) [Entry date 04/23/92]
210	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Ruby Gibbs Goggans on 4/13/92. (sh) [Entry date 04/23/92]
211	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Suzanne Heath Manges on 4/14/92 by hand delivery to Jettye Dreggors, Vice President, Nationsbank, as Agent for Suzanne Manges. (sh) [Entry date 04/23/92]

Sub #	Date	Description
212	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Heirs of J. L. Tatum on 4/15/92 by hand delivery to Paul A. Midkiff, Vice President, NationsBank Trustee for the Mary A. Tatum Trust. (sh) [Entry date 04/23/92]
213	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Heirs of J. L. Tatum on 4/15/92 by hand delivery to Paul A. Midkiff, Vice President, NationsBank, agent for Tatum Family Agency No. 426901. (sh) [Entry date 04/23/92]
214	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Heirs of J. L. Tatum on 4/15/92 by hand delivery to Paul A. Midkiff, Vice President, NationsBank, as agent for Robert S. Tatum Family Agency 426900. (sh) [Entry date 04/23/92]
215	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Heirs of W. A. Moncrief on 4/15/92 by hand delivery to Melvin May, attorney and authorized agent of the executors of the will of W. A. Moncrief. (sh) [Entry date 04/23/92]
216	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Heirs of H. A. Harmon on 4/13/92 by hand delivery to Nancy H. Harmon, heir of H.A. Harmon. (sh) [Entry 04/23/92]
217	4/22/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Heirs of Maurice C. Breen on

Sub #	Date	Description
		4/8/92 by hand delivery to Timothy Breen. (sh) [Entry date 04/23/92]
218	4/23/92	MOTION by Ralph Wheeler, C. E. Wheeler to intervene, and for order designating intervenors as class representatives. (sh) [Entry date 04/24/92]
219	4/23/92	MOTION by defendant Meridian Oil, Inc. for leave to file objections to Motion to Supplement Case Management Order No. 1. (sh) [Entry date 04/24/92]
220	4/23/92	OBJECTIONS by defendant Meridian Oil, Inc. to Plf's motion to supplement Case Management Order No. 1 [173-1]. (sh) [Entry date 04/24/92]
221	4/23/92	ATTORNEY APPEARANCE for defendant Tiffany Gas Company by Hugh V. Schaefer. (sh) [Entry date 04/24/92]
222	4/23/92	MOTION by plaintiff Southern Ute Indian for leave to respond to Federal Defts' Motion for Enlargement of Time. (sh) [Entry date 04/24/92]
223	4/23/92	RESPONSE by plaintiff Southern Ute Indian to Federal Defts' motion to extend time to 5/30/92 to answer Plf's Complaint [195-1]. (sh) [Entry date 04/24/92]
224	4/23/92	MINUTE ORDER: by Judge Lewis T. Babcock granting Federal Defts' motion to extend time to 5/30/92 to answer Plf's Complaint [195-1]. (cc: all counsel); entry date: 4/24/92 (sh) [Entry date 04/24/92]
225	4/24/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Katherine Frances McElvain Harvey on 4/21/92. (sh)

Sub #	Date	Description
226	4/24/92	ACCEPTANCE / ACKNOWLEDGEMENT OF SERVICE by defendant Katherine B. McElvain served on 4/21/92; signed by Thornton H. McElvain, Jr. pursuant to copy of Power of Attorney attached. (sh)
227	4/24/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Thornton H. McElvain Jr. on 4/21/92. (sh)
228	4/24/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Henry Ashworth on 4/20/92. (sh)
229	4/24/92	SCHEDULING ORDER Judge Lewis T. Babcock; Discovery cutoff set for 4/26/93 (re Class Action Claim/defenses); rule 16 conf held 9:00 4/24/92. (cc: all counsel) (sh)
230	4/24/92	CASE MANAGEMENT ORDER NO. 1 by Judge Lewis T. Babcock; another rule 16 conference set for 2:00 p.m. on 6/19/92. Sets forth Class Issues, Discovery and Further Proceedings, and the Next Conference. (cc: all counsel); entry date 4/24/92 (sh)
231	4/24/92	ORDER by Judge Lewis T. Babcock granting Plf's motion to supplement Case Management Order No. 1 [173-1]—Supplement to Case Management No. 1 (cc: all counsel); entry date 4/24/92 (sh)
232	4/24/92	SUPPLEMENTAL Order of Reference [180-1]—to Mag. Abram to form a steering committee, selecting liaison counsel to disburse court notices and orders, process the equitable sharing of attorney fees/costs among defts, and supervise Plf's discovery efforts to compile a list of absent class members and drafting of notice to them. (sh)

Sub #	Date	Description
233	4/24/92	COURTROOM MINUTES by Judge Lewis T. Babcock granting Case Management Order #1 [112-1] with these changes: Paragraph 7: other named defts reserve right to present evidence at trial of bifurcated issues; USA permitted to participate in discovery; Paragraph 11: 2nd line—Strike "and Federal Defts", add: any deft is granted leave to answer complaint; Paragraph 12: amend to: except motions going to jurisdiction of court. Status Conf set 6/19/92 at 2:00 p.m. (for 2 hours). Case Management Order #1 includes Order to certify class as stated in order, and Order to bifurcate as stated in the order. Court amends paragraph 7A of Supplemental Order: Plf to bear discovery costs and will reimburse oil company defts 25% of those deft's title costs expended for records and title data used to prepare the notice lsit. Court signs Joint Stipulated Plan and Schedule for Discovery. Court to issue supplemental Order of Reference to Chief Mag. Abram [180-1]. Court reserves ruling on issues of severance tax and on question of ongoing operations. Plf to file motion/brief on administering the severance tax within 10 days; defts to respond 10 days thereafter. Plf to reply 10 days thereafter. Same briefing schedule re Fuelco's brief filed 4/14/92 re equitable relief pending good/bad faith issues, determination. entry date : 4/30/92 (sh) [Entry date 04/30/92]
234	5/1/92	RETURN OF SERVICE of Summons and Complaint upon / by defendant Margaret C. Pargin on 4/17/92 (yk)

Sub #	Date	Description
235	5/1/92	RETURN OF SERVICE of Summons and Complaint upon / by defendant Myra Theresa Moulds on 4/17/92 (yk)
236	5/1/92	RETURN OF SERVICE of Summons and Complaint upon / by defendant John David Mosbacher on 4/20/92 (yk)
237	5/1/92	RETURN OF SERVICE of Summons and Complaint upon Barbara Sena, process Clk for Corporation Co agent for defendant Hondo Oil & Gas Co on 4/20/92 (yk)
238	5/1/92	ANSWER by defendant North Central Oil complaint [1-1] (yk) [Entry date 05/04/92]
239	5/4/92	MOTION by plaintiff Southern Ute Indian, defendant McKenzie Methane to stay responsive pleading requirement pending settlement approval (lm) [Entry date 05/06/92]
240	5/6/92	TRANSCRIPT of proceedings (Hearing Re Case Management Order and Rule 16) before Judge Babcock on 4/24/92 pgs 1-81 (cert-copy) (lm)
241	5/6/92	ANSWER by defendant Tiffany Gas Company to Plf's complaint [1-1]. (sh) [Entry date 05/08/92]
242	5/6/92	ORDER by Judge Lewis T. Babcock granting Plf/McKenzie Methane's motion to stay responsive pleading requirement pending settlement approval [239-1]. (cc: all counsel) ; entry date : 5/8/92 (sh) [Entry date 05/08/92]
243	5/8/92	BRIEF FILED by plaintiff Southern Ute Indian re: Continuing Coalbed Methane Operations during Pendency of this Action. (sh) [Entry date 05/11/92]

Sub #	Date	Description
244	5/8/92	MOTION by plaintiff Southern Ute Indian to file brief re preliminary severance tax issues that exceeds page limitation. (sh) [Entry date 05/11/92]
245	5/8/92	BRIEF FILED by plaintiff Southern Ute Indian re Preliminary Severance Tax Issues. (sh) [Entry date 05/11/92]
246	5/11/92	MINUTE ORDER: by Judge Lewis T. Babcock granting Plf's motion to file brief re preliminary severance tax issues that exceeds page limitation [244-1]. (cc: all counsel); entry date: 5/12/92 (sh) [Entry date 05/12/92]
247	5/15/92	MOTION by plaintiff Southern Ute Indian for reconsideration of the Court's 4/24/92 order re allocation of costs for discovery of names & addresses of the deft class. (sh) [Entry date 05/18/92] [Edit date 05/18/92]
248	5/15/92	BRIEF by plaintiff Southern Ute Indian in support of motion for reconsideration of the Court's 4/24/92 order re allocation of costs for discovery of names & addresses of the deft class [247-1]. (sh) [Entry date 05/18/92]
249	5/15/92	CERTIFICATE of Service by plaintiff Southern Ute Indian—mailing copies of the Motion to Reconsider Allocation of Costs and the Memo in Support thereof. (sh) [Entry date 05/18/92]
250	5/19/92	ATTORNEY APPEARANCE for defendant Palo Petroleum, Inc. by Robert C. Hawley. (sh) [Entry date 05/20/92]
251	5/20/92	MOTION by defendant Amoco Production Co to extend time to 6/14/92 to respond

Sub #	Date	Description
		to Plf's motion to reconsider allocation of costs and advice re notice list. (sh) [Entry date 05/21/92]
252	5/21/92	MOTION by defendant Palo Petroleum, Inc. to withdraw attorney James Bruce and William P. Gosdman. (sh)
253	5/21/92	NOTICE of Withdrawal of attorneys to defendant Palo Petroleum, Inc. (sh)
254	5/21/92	MINUTE ORDER: by Judge Lewis T. Babcock granting Amoco's motion to extend time for 20 days to respond to Plf's motion to reconsider allocation of costs and advice re notice list. [251-1] (cc: all counsel); entry date: 5/22/92 (sh) [Entry date 05/22/92]
255	5/22/92	MOTION by defendant Richmond Petroleum to file response brief re preliminary severance tax issues that exceeds page limitation. (sh)
256	5/22/92	RESPONSE by defendant Richmond Petroleum to Plfs brief re Preliminary Severance Tax Issues [245-1]. (sh)
257	5/22/92	JOINDER by defendant Palo Petroleum, Inc. re Amoco's motion to extend time to 6/4/92 to respond to Plf's motion to reconsider allocation of costs and advice re notice list [251-1]. (sh) [Entry date 05/26/92]
258	5/22/92	MOTION by defendant Amoco Production Co to file brief to Plf's 2 briefs to exceed page limitation. (sh) [Entry date 05/26/92]
259	5/22/92	RESPONSE by defendant Amoco Production Co, to brief [245-1] re interim relief that should be provided during the pend-

Sub #	Date	Description
		ency of the litiation for ongoing oil and gas operations and brief [243-1] re severance tax payments. (sh) [Entry date 05/26/92]
260	5/28/92	MINUTE ORDER: by Judge Lewis T. Babcock granting Amoco's motion to file brief to Plf's 2 briefs to exceed page limitation [258-1]. Granting Richmond's motion to file response brief re preliminary severance tax issues that exceeds page limitation [255-1]. (cc: all counsel); entry date: 5/28/92 (sh)
261	5/28/92	JOINDER by defendant Richmond Petroleum in Amoco's motion to extend time to 6/4/92 to respond to Plf's motion to reconsider allocation of costs and advice re notice list [251-1]. (sh) [Entry date 05/29/92]
262	6/1/92	ANSWER by defendant Katherine B. McElvain, defendant Thornton H. McElvain Jr., defendant Katherine Frances McElvain Harvey to Plf's complaint [1-1]. The Certificate of Service was not signed or dated. (sh) [Entry date 06/02/92] [Edit date 06/02/92]
263	6/3/92	MINUTE ORDER: by Judge Lewis T. Babcock re Defts have to 6/23/92 to respond to Plf's Motion to Reconsider Allocation of Costs [247-1]. (cc: all counsel); entry date: 6/4/92 (sh) [Entry date 06/04/92]
264	6/4/92	RETURN OF SERVICE of Summons and Complaint upon Heirs of defendant George C. Vance, Deceased on 5/26/92 by hand delivery to Greg Schlepp, Authorized Agent for Service. (sh)

Sub #	Date	Description
265	6/4/92	RETURN OF SERVICE of Summons and Complaint upon defendant McMurry Oil Company on 5/26/92 by hand delivery to John Martin, Registered Agent. (sh)
266	6/4/92	RETURN OF SERVICE of Summons and Complaint upon defendant W. R. McMahon on 5/21/92. (sh)
267	6/4/92	RETURN OF SERVICE of Summons and Complaint upon defendant Dorothy N. McKelvey on 5/21/92. (sh)
268	6/4/92	RETURN OF SERVICE of Summons and Complaint upon defendant Hyde Oil Gas Corp on 5/21/92 by hand delivery to C. Brodie Hyde. (sh)
269	6/4/92	BRIEF by defendant Amoco Production Co in opposition to Plf's motion for reconsideration of the Court's 4/24/92 order re allocation of costs for discovery of names & addresses of the deft class [247-1]. (sh) [Entry date 06/05/92]
270	6/8/92	MOTION by plaintiff Southern Ute Indian to exceed page limitation in filing reply brief re interim relief affecting ongoing oil and gas operations and severance tax payments. (sh) [Entry date 06/09/92]
271	6/8/92	REPLY by plaintiff Southern Ute Indian re Brief [245-1], re Brief [243-1] re interim relief affecting ongoing oil and gas operations and severance tax payments. (sh) [Entry date 06/09/92]
272	6/8/92	ORDER by Judge Lewis T. Babcock granting Palo Petroleum's motion to withdraw attorney James Bruce and William P. Gosdman. [252-1] Withdrawing attorney James Garrett Bruce for Palo Petroleum, Inc.,

Sub #	Date	Description
		attorney William P. Godsman for Palo Petroleum, Inc. (cc: all counsel); entry date: 6/9/92 (sh) [Entry date 06/09/92]
273	6/8/92	MINUTE ORDER: by Judge Lewis T. Babcock granting Plf's motion to exceed page limitation in filing reply brief re interim relief affecting ongoing oil and gas operations and severance tax payments [270-1]. (cc: all counsel); entry date: 6/9/92 (sh) [Entry date 06/09/92]
274	6/9/92	ORDER by Magistrate Judge Donald E. Abram re Supplemental Order of Reference [232-1], the steering committee of the defts to consist of: Amoco Prod Co., Meridian Oil, Conoco Oil, Justice Dept., Wheeler Landowners rep, Verce Landowners rep, and Fuel Resources Development Co. Lead counsel to be David E. Brody, and Thomas S. Nichols. The Notice of Pendency of Class Action and Rights of Class Members is approved by the Court. Status Conf set for 8:30 a.m. on 7/27/92. (cc: all counsel); entry date: 6/10/92 (sh) [Entry date 06/10/92]
274	6/9/92	NOTICE of Pendency of Class Action and of Rights of Class Members approved by Court. (sh) [Entry date 06/10/92]
275	6/11/92	AFFIDAVIT of Kevin J. Kilstrom regarding Brief response [259-1] on Interim Relief that Should be Provided During the Pendency of the Litigation for Ongoing Oil and Gas Operations and Severance Tax Payments. (This document is the original Affidavit. A copy of the Affidavit was attached to the original response.) (sh) [Entry date 06/15/92]

Sub #	Date	Description
276	6/12/92	Joint STATUS REPORT by plaintiff Southern Ute Indian; defendant Amoco Production Co. (sh) [Entry date 06/15/92]
277	6/12/92	REPLY by plaintiff Southern Ute Indian re Richmond Petroleum's Response Brief [256-1] to Preliminary Severance Tax Issues [245-1] brief. (sh) [Entry date 06/15/92]
278	6/12/92	RETURN OF SERVICE of Summons and Complaint upon defendant R. Franklin McKelvey on 5/22/92. (sh) [Entry date 06/15/92]
279	6/18/92	Notice of Filing Supplemental AFFIDAVIT of John Hasche in further support of Amoco's response in opposition to Pltf's motion to reconsider allocation of costs [269-1] (gc)
280	6/19/92	COURTROOM MINUTES by Judge Lewis T. Babcock; Rule 16/Status Conference held 2:00 6/19/92; In Court Hearing set for 10:00 a.m. on 8/21/92 to hear all pending motions (2 hours). USA to file responsive pleading to the Complaint [1-1] within 30 days. Plf to file reply to Motion for Reconsideration of Allocation of Costs [247-1] by 6/23/92 at 5:00 p.m. Plf and Defts agree to submit Motion for Reconsideration on the briefs. entry date: 6/24/92 (sh) [Entry date 06-24-92]
281	6/23/92	REPLY by plaintiff Southern Ute Indian to Amoco's response to motion for reconsideration of the Court's 4/24/92 order re allocation of costs for discovery of names & addresses of the deft class [247-1]. (sh) [Entry date 06/24/92]
282	6/24/92	ORDER by Judge Lewis T. Babcock granting Joint motion for entry of Case Manage-

Sub #	Date	Description
		ment No. 1 [112-1]; granting Plf's motion to supplement Case Management Order No. 1 [173-1]. (Nunc pro tunc 4/24/92.) (cc: all counsel); entry date: 6/24/92 (sh)
283	6/24/92	ORDER by Judge Lewis T. Babcock denying Plf's motion for reconsideration of the Court's 4/24/92 order re allocation of costs for discovery of names & addresses of the deft class [247-1]. (cc: all counsel); entry date: 6/24/92 (sh)
284	6/26/92	MOTION by plaintiff Southern Ute Indian to extend time to respond to Amoco's First set of interrogs to Plf and Amoco's First req for prod of documents. (sh)
285	6/26/92	MOTION by plaintiff Southern Ute Indian for (limited Settlement Conference) hearing. (sh)
286	6/26/92	Witness list (Designation of Witnesses in Response to Notice of Limited Deposition Under rule 30(b)(6) Submitted by Amoco Prod Co.) submitted by plaintiff Southern Ute Indian (sh)
287	6/26/92	MOTION by defendant Amoco Production Co to extend 7/29/92 to respond to Plf's discovery (sh) [Entry date 06/29/92]
288	6/29/92	STATEMENT by defendant Markwest Energy Prt in support of Plf's motion for (limited Settlement Conference) hearing [285-1]. (sh)
289	6/30/92	MOTION by defendant Palo Petroleum, Inc. to exceed page limitation in filing its Brief Re Relief Affecting Oil and Gas Operations and severance Tax Payments. (sh) [Entry date 07/01/92]

Sub #	Date	Description
290	6/30/92	BRIEF FILED by defendant Palo Petroleum, Inc. regarding Plf's Brief re Severance Tax Payments [245-1], and regarding Ongoing Oil and Gas Operations [243-1]. (sh) [Entry date 07/01/92]
291	7/1/92	RETURN OF SERVICE of Summons and Complaint upon defendant J. M. Eakes on 5/29/92 by hand delivery to David Hersch, his conservator. (sh) [Entry date 07/02/92]
292	7/1/92	RETURN OF SERVICE of Summons and Complaint and other documents upon defendant Helen Miller on 6/19/92 by hand delivery to Reese Miller for the heirs of Helen L. Miller. (sh) [Entry date 07/02/92]
293	7/1/92	RETURN OF SERVICE of Summons and Complaint upon defendant Hardin Simmons Univ on 6/12/92 by hand delivery to Bill Tippen, Registered Agent. (sh) [Entry date 07/02/92]
294	7/2/92	Opposition of Federal Defendants' to Tribe's request to Chief Magistrate for limited settlement conference (lf) [Entry date 07/06/92]
295	7/2/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to exceed page limitation in filing its Brief Re Relief Affecting Oil and Gas Operations and severance Tax Payments. [289-1] (cc: all counsel): entry date: 7/6/92 (lf) [Entry date 07/06/92]
296	7/6/92	NOTICE OF APPEAL by plaintiff Southern Ute Indian in re order [283-1] of 6/24/92; Notice of transcript order form

Sub #	Date	Description
		due 7/16/92; Notice mailed to all counsel on 7/7/92 (gc)
—	7/6/92	$100.00 fee and $5.00 fee paid. Receipt No 143664. re appeal [296-1] (gc)
297	7/7/92	RESPONSE in opposition by plaintiff Southern Ute Indian to Palo Petroleum's motion to exceed page limitation in filing its Brief Re Relief Affecting Oil and Gas Operations and severance Tax Payments. [289-1] (gc) [Entry date 07/08/92]
297	7/7/92	MOTION by plaintiff Southern Ute Indian to strike brief of Palo Petroleum re relief affecting ongoing oil and gas operations and severance tax payments (gc) [Entry date 07/08/92]
298	7/8/92	REPLY by plaintiff Southern Ute Indian to Federal Defts' response in opposition to motion for (limited Settlement Conference) hearing. [285-1] (gc)
299	7/9/92	Case No. 92-1201 assigned by the Court of Appeals. (gc)
300	7/13/92	ORDER by Magistrate Judge Donald E. Abram granting Amoco motion to extend time to respond to Plf's discovery. [287-1] and granting Southern Ute's motion to extend time to respond to Amoco's First set of interrogs to Plf and Amoco's First req for prod of documents [284-1], both to 7/31/92. Re: Southern Ute's request for limited settlement conf. [285-1] and Federal defts' opposition, the tribe and the Dept. of Justice are to report in writing by 7/31/92 the status of the settlement of the McKenzie Methane Corp. and Mark West Energy Partners Ltd. claims. (cc:

Sub #	Date	Description
		all counsel); entry date: 7/14/92 (gc) [Entry date 07/14/92]
301	7/16/92	NOTICE OF TRANSCRIPT ORDER FORM filed by plaintiff/appellant Southern Ute Indian; (Necessary transcript already on file) re appeal [296-1] (gc)
302	7/16/92	LETTER (Re: 296-1]) to USCA and all counsel advising that record is now complete . . . tof filed stating transcript necessary is already on file. (gc)
303	7/20/92	ANSWER by Federal Defts Manuel Lujan Jr., DOI, BIA, BLM, Minerals Mgt Service, Eddie F. Brown, Delos Cy Jamison, Scott S. Sewell complaint [1-1] (gc) [Entry date 07/21/92]
304	7/20/92	LETTER to court from counsel for defendant Conoco, Inc., defendant Pablo Operating Co. re: corrections to names of counsel, etc. (gc) [Entry date 07/21/92]
305	7/23/92	LETTER to court from Laura Lindley of Poulson, Odell and Peterson, counsel defendant North Central Oil requesting that Charles R. Pirtle's (in house counsel) name be removed from service list as this law firm is representing this deft. (gc) [Entry date 07/24/92]
306	8/3/92	Designation of Expert Witness Testimony for defendant Conoco, Inc. (gc) [Entry date 08/04/92]
307	8/3/92	Designation of Expert Witness Testimony for defendant Palo Petroleum, Inc. (gc) [Entry date 08/04/92]
308	8/3/92	Notice of Fields of Expert Witness Testimony for plaintiff Southern Ute Indian (gc) [Entry date 08/04/92]

Sub #	Date	Description
309	8/3/92	Designation of Potential Areas of Expert Witness Testimony for defendant Fuel Resources Dev, defendant Natl Coop Refinery (gc) [Entry date 08/04/92]
310	8/3/92	MOTION by defendant Phillips Petroleum for attorney Susan L. Heady to appear pro hac vice (gc) [Entry date 08/04/92]
311	8/3/92	Statement of Potential Fields of Expert Witness Testimony for defendant Phillips Petroleum (gc) [Entry date 08/04/92]
312	8/3/92	MOTION by defendant Phillips Petroleum to substitute attorneys David C. Little and Kevin J. Kuhn of Montgomery, Little, Young, Campbell and McGrew in place of George M. Paulson, Jr. (gc) [Entry date 08/04/92]
313	8/4/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to substitute attorneys David C. Little and Kevin J. Kuhn of Montgomery, Little, Young, Campbell and McGrew in place of George M. Paulson, Jr. [312-1] . . . granting motion for attorney Susan L. Heady to appear pro hac vice [310-1] (cc: all counsel); entry date: 8/5/92 (gc) [Entry date 08/05/92]
314	8/5/92	MINUTE ORDER: by Magistrate Judge Donald E. Abram. Order of 6/9/92 [274-2] is amended to add the L.O.C.C. group to the steering committee.; Status Conferences are set 1:00 9/11/92, (Mag Conf) 1:00 10/16/92 and 11/20/92 at 1:00 pm.; Settlement Conference set 1:00 12/9/92, sch; (cc: all counsel); entry date: 8/6/92 (gc) [Entry date 08/06/92]
315	8/5/92	ORDER by Magistrate Judge Donald E. Abram. The attached Notice of Pendency

Sub #	Date	Description
		of Class Action and of Rights of Class Members submitted by the parties on 7/29/92 is approved by the court and shall be used in place of the Notice approved 6/9/92. (cc: all counsel); entry date: 8/6/92 (gc) [Entry date 08/06/92]
316	8/10/92	MOTION by Federal defendants for leave to file sur-reply to pltf Tribe's reply brief regarding interim relief affecting ongoing oil and gas operations and severance tax payments clarifying misstatements therein (gc) [Entry date 08/11/92]
—	8/10/92	Tendered Sur-reply to pltf Tribe's reply brief regarding interim relief affecting ongoing oil and gas operations and severance tax payments clarifying misstatements therein submitted by re defendant motion for leave to file sur-reply [316-1] (gc) [Entry date 08/11/92]
317	8/10/92	MINUTE ORDER: by Judge Lewis T. Babcock denying federal defts' motion for leave to file sur-reply to pltf Tribe's reply brief regarding interim relief affecting ongoing oil and gas operations and severance tax payments clarifying misstatements therein [316-1] (cc: all counsel); entry date: 8/11/92 (gc) [Entry date 08/11/92]
318	8/13/92	MOTION by defendant Mobil Oil Corp for attorney Marilyn P. Fineshriber to appear pro hac vice (gc) [Entry date 08/14/92]
319	8/14/92	ATTORNEY APPEARANCE as co-counsel for plaintiff Southern Ute Indian by Michael T. McConnell (gc)
320	8/14/92	MINUTE ORDER: by Judge Lewis T. Babcock granting motion for attorney Marilyn P. Fineshriber to appear pro hac

Sub #	Date	Description
		vice [318-1] (cc: all counsel); entry date: 8/14/92 (gc)
321	8/17/92	ATTORNEY APPEARANCE as co-counsel for plaintiff Southern Ute Indian by John Stephen Pfeiffer (gc) [Entry date 08/18/92]
322	8/20/92	NOTICE by plaintiff Southern Ute Indian of supplemental tribal court decision. (gc) [Entry date 08/21/92]
323	8/20/92	MOTION by plaintiff Southern Ute Indian to amend complaint (to correct errors in names of certain defts, substitute trustees of trusts in place of individual defts, delete names of other defts and ad defts) (gc) [Entry date 08/21/92]
—	8/20/92	Tendered First Amended Complaint submitted by plaintiff Southern Ute Indian re: motion to amend complaint (to correct errors in names of certain defts, substitute trustees of trusts in place of individual defts, delete names of other defts and add defts) [323-1] (gc) [Entry date 08/21/92]
324	8/21/92	MOTION by defendant Tiffany Gas Company for extension of time to submit title cost datea to 9/18/92 (gc) [Entry date 08/24/92]
325	8/21/92	COURTROOM MINUTES by Judge Lewis T. Babcock; In Court Hearing held 8/21/92. Court notes pltf filed a notice of appeal on 7/5/92. Court heard argument on severance tax issue and will defer ruling until issue of whether this court has jurisdiction (in light of appeal) is resolved. Demonstrative exhibit submitted (attached to minutes). Counsel to file status report

Sub #	Date	Description
		each week beginning next Friday re: court's jurisdiction re: U.S. Court of Appeals; entry date: 8/24/92 (gc) [Entry date 08/24/92]
326	8/21/92	NOTICE by defts Meridian Oil, Inc., Amax Oil & Gas, Inc., Pablo Operating Co, Palo Petroleum, Inc., Richmond Petroleum, Natl Coop Refinery, Phillips Petroleum, Amoco Production Co of submission of billings for costs and expenses for records and title data (gc) [Entry date 08/24/92]
327	8/21/92	STATEMENT by defendant Mobil Oil Corp of costs (gc) [Entry date 08/24/92]
328	8/21/92	MOTION by defendant Bowen/Edwards Assoc for extension of time to file billings for accumulating landowner's names to 9/11/92 (gc) [Entry date 08/24/92]
329	8/25/92	Amended (SUPPLEMENT) notice of submission of billsings by defendant Amoco Production Co re notice [326-1] (gc) [Entry date 08/27/92]
330	8/28/92	Joint STATUS REPORT by plaintiff Southern Ute Indian, and defendant Amoco Production Co as class representative regarding jurisdiction (gc) [Entry date 08/31/92]
331	8/31/92	ORDER by Magistrate Judge Donald E. Abram granting Tiffany Gas' motion for extension of time to submit title cost datea to 9/18/92 [324-1] (cc: all counsel); entry date: 9/2/92 (gc) [Entry date 09/02/92]
332	8/31/92	ORDER by Magistrate Judge Donald E. Abram granting Bowen/Edward Explorations' motion for extension of time to file billings for accumulating landowner's

Sub #	Date	Description
		names to 9/11/92 [328-1] (cc: all counsel); entry date: 9/2/92 (gc) [Entry date 09/02/92]
333	9/1/92	MINUTE ORDER: by Magistrate Judge Donald E. Abram finding the Tribe's motion for (limited Settlement Conference) hearing. [285-1] moot, since Dept. of Interior has acted on the settlement. (cc: all counsel); entry date: 9/3/92 (gc) [Entry date 09/03/92]
334	9/4/92	Second Joint STATUS REPORT by plaintiff Southern Ute Indian, defendant Amoco Production Co regarding jurisdiction (gc) [Entry date 09/09/92]
335	9/4/92	Consent (RESPONSE) by defendant Conoco, Inc. to motion to amend complaint (to correct errors in names of certain defts, substitute trustees of trusts in place of individual defts, delete names of other defts and add defts) [323-1] (gc) [Entry date 09/09/92]
335	9/4/92	ANSWER by defendant Conoco, Inc. to amended complaint (adopting and incorporating Conoco's answer filed 2/10/92) (gc) [Entry date 09/09/92]
336	9/8/92	Second Amended (SUPPLEMENT) by defendant Amoco Production Co, defendant Bowen/Edwards Assoc notice of submission of billings [326-1] (gc) [Entry date 09/09/92]
337	9/11/92	Third Joint STATUS REPORT Regarding Jurisdiction by plaintiff Southern Ute Indian, defendant Amoco Production Co (gc) [Entry date 09/14/92]
338	9/11/92	Letter from Susie M. Kleinman, Legal Sec., at Davis, Graham & Stubbs, counsel for

Sub #	Date	Description
		defendant Amoco Production Co with Exhibit 1 that was inadvertently not attached to the Third joint status report regarding jurisdiction filed 9/11/92 [337-1] (gc) [Entry date 09/14/92]
339	9/14/92	MOTION by defendant Richmond Petroleum to withdraw attorneys James P. Rouse and Steven F. Mueller of Burns, Wall, Smith and Mueller (gc)
340	9/14/92	NOTICE to defendant Richmond Petroleum of Withdrawal by Burns, Wall, Smith & Mueller (gc)
341	9/14/92	Consent (RESPONSE) by defendant Tiffany Gas Company to motion to amend complaint [323-1] (gc) [Entry date 09/16/92]
341	9/14/92	ANSWER by defendant Tiffany Gas Company to amended complaint [1-1] (gc) [Entry date 09/16/92]
342	9/14/92	MINUTE ORDER: by Magistrate Judge Donald E. Abram; Status Conference held 9/11/92 (cc: all counsel); entry date: 9/16/92 (gc) [Entry date 09/16/92]
343	9/16/92	Supplemental STATEMENT by defendant Amoco Production Co in support of interim relief for ongoing operations (gc)
344	9/18/92	MOTION by defendant Tiffany Gas Company for extension of time to submit title cost data to 10/16/92 (gc) [Entry date 09/21/92]
345	9/18/92	Fourth Joint STATUS REPORT by plaintiff Southern Ute Indian, defendant Amoco Production Co regarding jurisdiction (gc) [Entry date 09/21/92]

Sub #	Date	Description
346	9/22/92	ORDER by Magistrate Judge Donald E. Abram granting Tiffany Gas' motion for extension of time to submit title cost data to 10/16/92 [344-1] (cc: all counsel); entry date: 9/24/92 (gc) [Entry date 09/24/92]
347	9/23/92	MOTION by Dennis Bicknell, Director Colo Oil/Gas Conservation Comm to quash subpoena duces tecum, and for protective order prohibiting Pltf from examining Dennis Bicknell re: information in returns (gc) [Entry date 09/24/92]
348	9/23/92	ATTORNEY APPEARANCE for Colo Oil/Gas Conservation Comm by Timothy J. Monahan, Attorney General's Office (gc) [Entry date 09/24/92]
349	9/24/92	MOTION by plaintiff Southern Ute Indian to strike Amoco's supplemental statement in support of interim relief for ongoing operations, or in the alternative for leave to file attached tribal response to Amoco's supplemental statement in support of interim relief for ongoing operations (gc)
—	9/24/92	Tendered Response to Amoco's Supplemental Statement in Support of Interim Relief for Ongoing Operations submitted by plaintiff Southern Ute Indian re motion for leave to file attached tribal response to Amoco's supplemental statement in support of interim relief for ongoing operations [349-2] (gc)
350	9/24/92	MOTION by defendant Amoco Production Co to quash subpoena issued to Dennis Bicknell, Director of Oil and Gas Conservation Commission, and for protective order that the documents described in such subpoena not be produced and joinder in motion filed by State of Colorado to quash and for protective order re: this subpoena (gc) [Entry date 09/25/92]

Sub #	Date	Description
351	9/25/92	Fifth Joint STATUS REPORT Regarding Jurisdiction by plaintiff Southern Ute Indian, defendant Amoco Production Co (gc)
352	10/1/92	MINUTE ORDER: by Magistrate Judge Donald E. Abram setting hearing on motion to quash subpoena duces tecum [347-1], motion for protective order prohibiting Pltf from examining Dennis Bicknell re: information in returns [347-2], motion to quash subpoena issued to Dennis Bicknell, Director of Oil and Gas Conservation Commission [350-1], motion for protective order that the documents described in such subpoena not be produced [350-2], motion to strike Amoco's supplemental statement in support of interim relief for ongoing operations [349-1], motion for leave to file attached tribal response to Amoco's supplemental statement in support of interim relief for ongoing operations [349-2] all at 1:00 10/16/92 (cc: all counsel); entry date: 10/1/92 (gc)
353	10/2/92	Sixth Joint STATUS REPORT by plaintiff, defendant Amoco (gc)
354	10/2/92	Joint MOTION by Pltf Southern Ute Indian and Deft Markwest Energy Prt to approve settlement agreement, and to dismiss claims against Markwest (This document and its attachments were submitted under seal—but was unsealed per court order of 10/28/92. Document as removed from the vault and placed in the file) (gc) [Edit date 10/30/92]

Sub #	Date	Description
355	10/2/92	Letter (STATEMENT) by Barry Spector, counsel for defendant Markwest Energy Prt re motion to approve settlement agreement [354-1] and motion to dismiss claims against Markwest [354-2] . . . requesting that a copy of the motion be placed in the file as it is not confidential, but originnl motion and attachments are confidential and are submitted in a sealed envelope. (gc)
356	10/2/92	TRANSCRIPT of Hearing on Motions Re: Interim Relief and Severance Tax on 8/21/92 before Judge Babcock. Pages 1-64 (Cert. Copy) (gc) [Entry date 10/05/92]
357	10/5/92	ORDER by Judge Lewis T. Babcock granting motion to withdraw attorneys James P. Rouse and Steven F. Mueller of Burns, Wall, Smith and Mueller [339-1] attorney James Parker Rouse Sr. for Richmond Petroleum (cc: all counsel); entry date: 10/5/92 (gc)
358	10/5/92	MOTION by plaintiff Southern Ute Indian to compel Dennis Bicknell to produce documents in accordance with subpoena duces tecum (gc) [Entry date 10/06/92]
359	10/5/92	RESPONSE by plaintiff Southern Ute Indian to Dennis Bicknell, Dir. Colorado Oil and Gas Consv. Comm's motion to quash subpoena duces tecum [347-1] and motion for protective order prohibiting Pltf from examining Dennis Bicknell re: information in returns [347-2] and Amoco's motion to quash subpoena issued to Dennis Bicknell, Director of Oil and Gas Conservation Commission [350-1] and motion for protective order that the documents described in such subpoena not be produced [350-2] (gc) [Entry date 10/06/92]

Sub #	Date	Description
359	10/5/92	Memorandum BRIEF by plaintiff Southern Ute Indian in support of motion to compel Dennis Bicknell to produce documents in accordance with subpoena duces tecum [358-1] (gc) [Entry date 10/06/92]
360	10/6/92	Joint Motion by plaintiff Southern Ute Indian, defendant McKenzie Methane to dismiss before Judge Lewis T. Babcock (Filed under seal—Court ordered this document unsealed in Order of 10/28/92—document placed in the file) (gc) [Entry date 10/07/92] [Edit date 11/02/92]
361	10/8/92	MINUTE ORDER: by Magistrate Judge Donald E. Abram. Response to motion to compel filed by pltf 10/5/92 [358-1] shall be filed by 10/15/92 (cc: all counsel); entry date: 10/9/92 (gc) [Entry date 10/09/92]
362	10/8/92	ORDER by Judge Lewis T. Babcock denying motion of Pltf and Deft MarkWest to approve settlement agreement [354-1] and denying motion of Pltf. and Deft MarkWest to dismiss claims against Markwest [354-2] without prejudice and with leave granted to submit an amended motion deleting the condition of confidentiality, or in the alternative, setting forth with specificity the reason justifying such a condition, the motion to be submitted within 20 days. (cc: all counsel); entry date: 10/9/92 (gc) [Entry date 10/09/92] [Edit date 10/09/92]
363	10/8/92	ORDER by Judge Lewis T. Babcock denying Pltf's and Deft McKenzie's motion to dismiss before Judge Lewis T. Babcock [360-1] without prejudice and with leave granted to submit an amended motion delet-

Sub #	Date	Description
		ing the condition of confidentiality, or in the alternative, setting forth with specificity the reasons justifying such a condition, the motion to be submitted within 20 days. (cc: all counsel); entry date: 10/9/92 (gc) [Entry date 10/09/92]
364	10/8/92	CERTIFICATE by plaintiff Southern Ute Indian of mailing of Joint Motion of Pltf. and Deft MarkWest to Approve Settlement Agreement and to Dismiss Claims against MarkWest and proposed order and of Joint Motion of Pltf. and Deft Mckenzie to Approve Settlement Agreement and to Dismiss Claims against McKenzie and proposed Order on 10/7/92 (gc) [Entry date 10/09/92]
365	10/9/92	Seventh Joint STATUS REPORT Regarding Jurisdiction by plaintiff Southern Ute Indian, defendant Amoco Production Co (gc)
366	10/14/92	RESPONSE by defendant Amoco Production Co to motion to compel Dennis Bicknell to produce documents in accordance with subpoena duces tecum [358-1] (gc) [Entry date 10/15/92]
367	10/14/92	MOTION by Colo Oil/Gas Comm to vacate hearing on 10/16/92, and to extend time to respond to motion to compel to 10/23/92 (gc) [Entry date 10/20/92]
368	10/14/92	Unopposed MOTION by defendant Amoco Production Co for order that district court accept jurisdiction over pending matters unrelated to the Tribe's appeal (gc) [Entry date 10/20/92]
369	10/15/92	RESPONSE by defendant Amoco Production Co to Colo Oil and Gas Consrv.

Sub #	Date	Description
		Comm's motion to vacate hearing on 10/16/92 [367-1] and to extend time to respond to motion to compel to 10/23/92 [367-2] (gc) [Entry date 10/20/92]
370	10/15/92	ORDER by Judge Lewis T. Babcock granting Amoco's unopposed motion for order that district court accept jurisdiction over pending matters unrelated to the Tribe's appeal [368-1] (cc: all counsel); entry date: 10/20/92 (gc) [Entry date 10/20/92]
371	10/15/92	ORDER by Judge Lewis T. Babcock re [325-2]. Interim relief is granted as to ongoing coalbed methane gas operations and denied as to Tribe's severance tax (See order for detail) (cc: all counsel); entry date: 10/20/92 (gc) [Entry date 10/20/92]
372	10/16/92	COURTROOM MINUTES by Magistrate Judge Donald E. Abram; Mag Conf held 10/16/92 denying motion to vacate hearing on 10/16/92 [367-1] granting Bicknell's motion to extend time to respond to motion to compel to 10/23/92 [367-2]. Motion to compel Dennis Bicknell to produce documents in accordance with subpoena duces tecum [358-1] is submitted, that the motion to quash subpoena issued to Dennis Bicknell, Director of Oil and Gas Conservation Commission [350-1] is submitted, that the motion for protective order that the documents described in such subpoena not be produced [350-2] is submitted, that the motion to quash subpoena duces tecum [347-1] is submitted, that the motion for protective order prohibiting Pltf from examining Dennis Bicknell re: information

Sub #	Date	Description
		in returns [347-2] is submitted. These motions are held in abeyance with written order to issue. Denying motion to strike Amoco's supplemental statement in support of interim relief for ongoing operations [349-1]. Parties to submit a joint order for extending deadlines on the expert witnesses to the Mag. Judge for signature. entry date 10/20/92 (gc) [Entry date 10/20/92]
373	10/16/92	TRANSCRIPT of Hearing on Motions re: Interim Relief and Severance Tax on 8/21/92 before Judge Babcock. Pages 1-64 (Cert. Copy) (gc) [Entry date 10/20/92]
374	10/16/92	TRANSCRIPT of Status Conference on 6/19/92 before Judge Babcock. Pages 1-16 (Cert. Copy) (gc) [Entry date 10/20/92]
375	10/23/92	RESPONSE by Mr. Bicknell for Colo Oil/Gas Comm to motion to compel Dennis Bicknell to produce documents in accordance with subpoena duces tecum [358-1] (gc) [Entry date 10/28/92]
376	10/27/92	Amended Joint Motion by plaintiff Southern Ute Indian, defendant Markwest Energy Prt to approve settlement agreement and to dismiss claims against Markwest before Judge Lewis T. Babcock (gc) [Entry date 10/28/92]
377	10/28/92	ORDER by Judge Lewis T. Babcock granting amended joint motion to approve settlement agreement and to dismiss claims against Markwest before Judge Lewis T. Babcock [376-1]. Settlement agreement between Pltf and MarkWest Energy Partners dated 5/19/92 is approved and incorporated as part of this order. All claims of pltf. against Markwest Energy are dismissed

Sub #	Date	Description
		with prejudice. The attachments to the original joint motion of pltf and deft Markwest to approve settlement agreement and to dismiss claims against MarkWest [354-1], [354-2] are unsealed and said documents shall be placed in the public court file. Pltf and Deft MarkWest to make diligent efforts to notify those persons or entities eligible to ratify the settlement agreement, etc. Each party to bear its own costs. terminating party Markwest Energy Prt (cc: all counsel); entry date: 10/30/92 (gc) [Entry date 10/30/92]
379	10/28/92	ORDER by Judge Lewis T. Babcock granting amended joint motion to approve settlement agreement and to dismiss claims against McKenzie before Judge Lewis T. Babcock [378-1]. Settlement agreement entered between Pltf. and Deft McKenzie is approved and incorporated as a part of this order. All claims of pltf. against Markwest (sic) are dismissed with prejudice terminating party McKenzie Methane. Attachments to original joint motion of pltf. and deft McKenzie to approve settlement agreement and to dismiss claims against McKenzie [360-1] are unsealed and said documents shall be placed in the public court file. Pltf. and Deft McKenzie to make diligent efforts to notify those persons or entities eligible to ratify the settlement agreement of the pendency of this aaction, of the cert. of deft. class and of the option of ratification of settlement agreement. Each party to bear its own costs (cc: all counsel); entry date: 11/2/92 (gc) [Entry date 11/02/92]
378	10/29/92	Amended Joint Motion by plaintiff Southern Ute Indian, defendant McKenzie Me-

Sub #	Date	Description
		thane to approve settlement agreement and to dismiss claims against McKenzie before Judge Lewis T. Babcock (gc) [Entry date 11/02/92]
380	10/29/92	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co to modify order re: joint stipulated plan and schedule for discovery (gc) [Entry date 11/02/92]
381	11/2/92	AMENDED ORDER by Judge Lewis T. Babcock re [379-2] re [378-1] Settlement agreement between pltf. and McKenzie Methane Corp is approved and incorporated as part of this order. All claims of pltf. against McKenzie Methane Corp. are dismissed with prejudice. Attachments to original joint motion of pltf. and deft McKenzie to approve settlement agreement and to dismiss claims against McKenzie are unsealed and said documents shall be place in the public court file. Pltf. and deft to make efforts to notify persons or entities eligible to ratify settlement agreement, etc. Each party to bear its own costs. (cc: all counsel); entry date: 11/5/92 (gc) [Entry date 11/05/92]
382	11/9/92	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co for entry of protective order for discovery (gc) [Entry date 11/10/92]
383	11/10/92	PROTECTIVE ORDER by Magistrate Judge Donald E. Abram: granting motion for entry of protective order for discovery [382-1]. Documents may be designated as "Confidential" or "Highly Confidential". Access to these documents is restricted (see order for detail). None of these pleadings shall be filed with the court except under

Sub #	Date	Description
		seal and shall have a legend to this effect prominently displayed. (cc: all counsel) (gc) [Entry date 11/12/92]
384	11/12/92	MOTION by defendant Palo Petroleum, Inc. for clarification and ruling on payment of Tribal severance taxes as ordered on 10/15/92 (gc) [Entry date 11/13/92]
385	11/13/92	ORDER by Judge Lewis T. Babcock granting Deft Palo Petroleum's motion for clarification and ruling on payment of Tribal severance taxes as ordered on 10/15/92 [384-1] (cc: all counsel); entry date: 11/19/92 (gc) [Entry date 11/19/92]
386	11/20/92	NOTICE by defendant JM Huber Corporation of attorney change of address of Thomas P. Dugan and Lon W. Abadie (gc)
387	11/20/92	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co for extension of time to submit letters stating settlement positions to 12/4/92 (gc) [Entry date 11/23/92]
388	11/20/92	Unopposed MOTION by defendant Amoco Production Co for extension of time for defts to respond to discovery to 30 days from time each such deft would be otherwise required to respond (gc) [Entry date 11/23/92]
389	11/25/92	AMENDMENT to unopposed motion for extension of time for defts to respond to discovery to 30 days from time each such deft would be otherwise required to respond [388-1] by Amoco Production Co (gc) [Entry date 11/27/92]
390	12/4/92	Reentry of ATTORNEY APPEARANCE for defendant Richmond Petroleum by James P. Rouse (gc) [Entry date 12/07/92]

Sub #	Date	Description
391	12/8/92	NOTICE by defendant Amoco Production Co of continuance of deposition of CLARENCE L. HARR to 12/11/92 at 1:00 pm (gc) [Entry date 12/09/92]
392	12/10/92	MEMORANDUM by Magistrate Judge Donald E. Abram; settlement conf held at 1:00 12/9/92 (gc) [Entry date 12/11/92]
393	12/17/92	Expedited Joint Motion by plaintiff Southern Ute Indian and unnamed deft SG Interests II, Ltd to approve settlement agreement and to dismiss claims against SG Interests II, Ltd before Judge Lewis T. Babcock (gc) [Entry date 12/18/92]
395	12/18/92	ORDER by Judge Lewis T. Babcock granting expedited joint motion to approve settlement agreement and to dismiss claims against SG Interests II, Ltd before Judge Lewis T. Babcock [393-1] Settlement agreement between Pltf. and SG Interests II, Ltd is approved and incorporated as part of this order. Pltf takes nothing and all claims of pltf against SG Interests are dismissed with prejudice. Pltf. and Deft to make diligent efforts to notify persons or entitities eleible to ratify settlement agreement. Each party to bear its own costs. (cc: all counsel); entry date: 12/21/92 (gc) [Entry date 12/21/92]
394	12/21/92	NOTICE by plaintiff Southern Ute Indian of withdrawal of attorney John S. Pfeiffer (gc)
396	12/23/92	NOTICE by defendant Amoco Production Co of taking deposition of COUNCIL OF ENERGY RESOURCE TRIBE on 1/4/93 at 9:30 am (gc)

Sub #	Date	Description
399	12/28/92	ORDER by Magistrate Judge Donald E. Abram granting motion for extension of time for defts to respond to discovery to 30 days from time each such deft would be otherwise required to respond [388-1]; Amoco has to 12/23/92 to respond to plf 2nd interrogs, req for prod and req for admissions and def oil companies that were served w/plf 1st interrogs, req for prod and req for admission have to 12/30/92 to respond to such discovery (cc: all counsel); entry date: 12/30/92 (yk) [Entry date 12/30/92]
400	12/28/92	ORDER by Magistrate Judge Donald E. Abram granting motion to modify order re: joint stipulated plan and schedule for discovery [380-1] as to expert witness information only (cc: all counsel); entry date: 12/30/92 (yk) [Entry date 12/30/92]
401	12/18/92	MINUTE ORDER: by Magistrate Judge Donald E. Abram granting motion for extension of time to submit letters stating settlement positions to 12/4/92 [387-1]; mtn for extension to respond to discovery filed 11/20/92 filed by Amoco denied as moot, court having granted amended unopposed mtn for extension to respond; mag status conference set at 4:30 1/27/93; status conf set at 4:30 2/23/93; status conf. set at 4:30 3/24/93 (cc: all counsel); entry date: 12/30/92 (yk) [Entry date 12/30/92]
397	12/29/92	MOTION by defendant Richmond Petroleum to extend time to respond to plf 1st itnerrogs, req for prod and req for admissions (yk) [Entry date 12/30/92]
398	12/29/92	Certificate of Compliance by defendant Richmond Petroleum re: motion to extend

Sub #	Date	Description
		time to respond to plf 1st interrogs, req for prod and req for admissions [397-1] (yk) [Entry date 12/30/92]
402	12/30/92	ORDER by Magistrate Judge Donald E. Abram granting motion to extend time to respond to plf 1st itnerrogs, req for prod and req for admissions [397-1] to 1/29/93 (cc: all counsel); entry date: 12/30/92 (yk)
403	12/31/92	Designation of Rebutal Trial Expert Witness for defendant Conoco, Inc. (yk)
404	12/31/92	Designation of Rebuttal Trial Expert Witness for defendant Palo Petroleum, Inc. (yk)
405	1/11/93	MOTION by plaintiff Southern Ute Indian to compel Amoco Production Co. re attorney client privilege and work product immunity (gc) [Entry date 01/12/93]
407	1/14/93	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co to modify order: joint stipulated plan and schedule for discovery to allow additional expert witness designation (gc) [Entry date 01/15/93]
406	1/15/93	Designation of Oppositon Expert Witness for defendant Richmond Petroleum (yk)
408	1/15/93	Expert Witness designation for class action claim for defendant Amoco Production Co (gc)
409	1/15/93	Unopposed MOTION by defendant Amoco Production Co for leave to file response to pltf's motion to compel re: attorney-client privilege and work product immunity (gc) [Entry date 01/20/93]
410	1/15/93	Identification of experts for defendant Fuel Resources Dev (gc) [Entry date 01/20/93]

Sub #	Date	Description
411	1/15/93	Identification of Experts for defendant Natl Coop Refinery (gc) [Entry date 01/20/93]
412	1/15/93	MINUTE ORDER: by Magistrate Judge Donald E. Abram granting Amoco's motion for leave to file response to pltf's motion to compel re: attorney-client privilege and work product immunity [409-1] to 1/26/93 re [405-1] (cc: all counsel); entry date: 1/20/93 (gc) [Entry date 01/20/93]
413	1/20/93	MOTION by defendant Conoco, Inc. to withdraw attorney Thomas Burton (yk) [Entry date 01/21/93]
414	1/20/93	MOTION by defendant Conoco, Inc. for attorney Russell Dwight Howell to appear pro hac vice (yk) [Entry date 01/21/93]
415	1/20/93	CERTIFICATEof mailing of mtn to w/d, notice and mtn phv by defendant Conoco, Inc. (yk) [Entry date 01/21/93]
416	1/21/93	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to withdraw attorney Thomas Burton [413-1]; withdrawing attorney Thomas Hosea Burton Jr. for Conoco, Inc. Granting motion for attorney Russell Dwight Howell to appear pro hac vice [414-1]. (cc: all counsel); entry date: 1/25/93 (sh) [Entry date 01/25/93]
417	1/28/93	NOTICE by defendant Amoco Production Co of taking deposition of Harry Marsh on 2/2/93. (sh)
418	1/29/93	Motion by plaintiff Southern Ute Indian, Deft SG Intersts I, and Deft BellSouth Corp Health Care Trust to approve settlement agreement and to dismiss claims against SG Interests I, Ltd. and Bellsouth Corp Health Care Trust before Judge Lewis T. Babcock. (sh) [Edit date 02/09/93]

Sub #	Date	Description
419	1/29/93	Cross-MOTION by defendant Amoco Production Co to compel re: attorney-client privilege (gc) [Entry date 02/01/93]
420	1/29/93	RESPONSE by defendant Amoco Production Co to Pltf's motion to compel Amoco Production Co. re attorney client privilege and work product immunity [405-1] (gc) [Entry date 02/01/93]
420	1/29/93	Memorandum BRIEF by defendant Amoco Production Co in support of Cross-motion to compel re: attorney-client privilege [419-1] (gc) [Entry date 02/01/93]
421	2/2/93	MOTION by Landowner Coalseam Commttee to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. (gc)
422	2/2/93	MOTION by Landowner Coalseam Comm to file brief re: reformation and clarification of court's orders approving the settlements in excess of 10 pages (gc)
423	2/2/93	BRIEF by Landowner Coalseam Comm in support of motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1] (gc)
424	2/2/93	MOTION by Landowner Coalseam Comm for order for Pltf to give prompt notice to unnamed defendants, and to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class

Sub #	Date	Description
		representative for the subclass of mineral and overriding royaalty owner defts (gc) [Edit date 02/02/93]
425	2/2/93	MOTION by Landowner Coalseam Comm to file brief re: prompt notice to unnamed defts, to designate an additional class representative and to amend case management order no. 1 in excess of 10 pages (gc)
426	2/2/93	BRIEF by Landowner Coalseam Comm in support of motion for order for Pltf to give prompt notice to unnamed defendants [424-1], designate an additional class representative and to amend case management order No. 1 [424-2] (gc)
427	2/2/93	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co and lead counsel for Defts' Steering Committee for order limiting production of documents related to expert witnesses (gc)
428	2/5/93	MOTION by Landowner Coal Comm for accounting, show cause order and assurances from Palo Petroleum, Inc. re: suspended royalty payments (gc) [Entry date 02/08/93]
429	2/8/93	MOTION by Federal defendants for enlargment of time to respond to pltf's discovery to 3/26/93 (gc)
430	2/8/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Landowners Coalseam Committee's motion to file brief re: prompt notice to unnamed defts, to designate an additional class representative and to amend case management order no. 1 in excess of 10 pages [425-1] and granting Landowners Coalseam Committee's motion to file brief re: reformation and clarification

Sub #	Date	Description
		of court's orders approving the settlements in excess of 10 pages [422-1]. Responses to these motions are due 3/1/93 and Landowners have 10 days to reply [424-1] [424-2] [421-1]. The joint motion of Pltf. and Deft SG Interest, etc. to dismiss claims between these parties before Judge Lewis T. Babcock. [418-1] is stayed (is submitted) pending resolution of the motion to reform and clarify the court's order approving the settlement between Pltf. and Markwest Energy, et al (cc: all counsel); entry date: 2/9/93 (gc) [Entry date 02/09/93]
431	2/12/93	NOTICE by defendant Mobil Oil Corp, defendant North Central Oil of attorney change of address and firm affiliation (gc) [Entry date 02/16/23]
432	2/12/93	MOTION by plaintiff Southern Ute Indian for leave to file response to Amoco's cross motion to compel regarding attorney/client privilege and pltf's reply in support of its motion to compel in excess of 10 pages (gc) [Entry date 02/17/93]
433	2/12/93	RESPONSE by plaintiff Southern Ute Indian to Amoco's cross-motion to compel re: attorney-client privilege [419-1] (gc) [Entry date 02/17/93]
433	2/12/93	REPLY by plaintiff Southern Ute Indian to response to motion to compel Amoco Production Co. re attorney client privilege and work product immunity [405-1] (gc) [Entry date 02/17/93]
438	2/14/93	ORDER by Magistrate Judge Donald E. Abram granting joint motion for order limiting production of documents related to expert witnesses [427-1] (cc: all counsel); entry date: 2/22/93 (gc) [Entry date 02/22/93]
434	2/16/93	BRIEF by Landowner Coalseam Comm in support of Amoco's motion to compel re: attorney-client privilege [419-1] (gc) [Entry date 02/17/93]
435	2/16/93	MOTION by Landowner Coalseam Comm for order for acceptance of designation of expert witnesses (gc) [Entry date 02/17/93]
436	2/16/93	Designation of Expert Witness for Landowner Coal Comm (gc) [Entry date 02/17/93]
437	2/16/93	NOTICE by defendant Amoco Production Co of taking deposition of JEFFREY R. LEVINE on 3/1/93 at 9:30 am (gc) [Entry date 02/17/93]
439	2/16/93	ORDER by Magistrate Judge Donald E. Abram granting Amoco's motion for leave to file response to pltf's motion to compel re: attorney-client privilege and work product immunity [409-1] Tribe's reply brief and response to Amoco's cross motion to compel due 2/12/93 . . . Amoco's reply brief due 2/22/93 re [405-1], re [419-1] (cc: all counsel); entry date: 2/22/93 (gc) [Entry date 02/22/93]
440	2/16/93	ORDER by Magistrate Judge Donald E. Abram granting joint motion to modify order: joint stipulated plan and schedule for discovery to allow additional expert witness designation [407-1] re [229-1] (cc: all counsel); entry date: 2/22/93 (gc) [Entry date 02/22/93]
441	2/19/93	ORDER by Magistrate Judge Donald E. Abram granting Federal Defts' motion for

Sub #	Date	Description
		enlargment of time to respond to pltf's discovery to 3/26/93 [429-1] (cc: all counsel); entry date: 2/22/93 (gc) [Entry date 02/22/93]
442	2/19/93	MINUTE ORDER: by Judge Lewis T. Babcock granting motion for leave to file response to Amoco's cross motion to compel regarding attorney/client privilege and pltf's reply in support of its motion to compel in excess of 10 pages [432-1] . . . denying as moot motion to vacate hearing on 10/16/92 [367-1] and to extend time to respond to motion to compel to 10/23/92 [367-2]. In the future when discovery motions are filed, opposing party is given 11 days to file a response. (cc: all counsel); entry date: 2/22/93 (gc) [Entry date 02/22/93]
443	2/22/93	REPLY by defendant Amoco Production Co to pltif's response to cross-motion to compel re: attorney-client privilege [419-1] (gc) [Entry date 02/23/93]
443	2/22/93	RESPONSE by defendant Amoco Production Co to pltf's reply in support of its motion to compel Amoco Production Co. re attorney client privilege and work product immunity [405-1] (gc) [Entry date 02/23/93]
444	2/23/93	COURTROOM MINUTES by Magistrate Judge Donald E. Abram taking under advisement on 2/23/93 the motion to compel Amoco Production Co. re attorney client privilege and work product immunity [405-1], taking under advisement on 2/23/93 the motion to compel re: attorney-client privilege [419-1]; entry date: 2/24/93 (gc) [Entry date 02/24/93]

Sub #	Date	Description
445	2/25/93	Objection (RESPONSE) by defendant Palo Petroleum, Inc. to Landowners Coalseam Committee's motion for accounting, show cause order and assurances from Palo Petroleum, Inc. re: suspended royalty payments [428-1] (gc) [Entry date 02/26/93]
446	2/26/93	Objection (RESPONSE) by plaintiff Southern Ute Indian to Landowner Coalseam Committee's motion for order for acceptance of designation of expert witnesses [435-1] (gc) [Entry date 03/01/93]
447	2/26/93	NOTICE by defendant Anthony F. Zarlengo of his change of address (gc) [Entry date 03/01/93]
448	3/1/93	MOTION by plaintiff Southern Ute Indian for leave to file Tribe's brief in response to LOCC's brief in support of motion to give prompt notice to unnamed defendants, to desginate an additional class representative and to amend case management order No. 1 in excess of 10 pages (gc)
449	3/1/93	BRIEF by plaintiff Southern Ute Indian in opposition to LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2] (gc)
450	3/1/93	RESPONSE by plaintiff Southern Ute Indian to LOCC's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian

Sub #	Date	Description
		Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG interests I and Bellsouth Corp. [421-1] (gc)
451	3/1/93	RESPONSE by plaintiff Southern Ute Indian to LOCC's motion for accounting, show cause order and assurances from Palo Petroleum, Inc. re: suspended royalty payments [428-1] (gc)
452	3/1/93	RESPONSE by plaintiff Southern Ute Indian to LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2] (gc)
453	3/1/93	MOTION by SG Interests I, SG Interests II for attorney Claudia W. Frost to appear pro hac vice as co-counsel (gc)
454	3/1/93	Special ATTORNEY APPEARANCE for defendant Markwest Energy by Barry Spectors to respond to motion of LOCC to reform and clarify the court's orders approving the settlements between the Southern Ute Indian Tribe and Markwest Energy Partners, Ltd., et al (gc)
455	3/1/93	SUPPLEMENT by defendant Markwest Energy Prt attorney to special entry of appearance regarding motion of LOCC to reform and clarify the court's orders approving the settlements between the Southern Ute Indian Tribe and Markwest, et al [454-1] (gc)

Sub #	Date	Description
456	3/1/93	RESPONSE by SG Interests I, Ltd, SG Interests II, Ltd to LOCC's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1] and brief in support (gc)
457	3/1/93	MINUTE ORDER: by Magistrate Judge Donald E. Abram. Parties to submit privilege log to opposing counsel and court by 3/10/93 on cross motions to compel re [405-1], re [419-1] (cc: all counsel); entry date: 3/1/93 (gc)
458	3/1/93	ORDER by Magistrate Judge Donald E. Abram granting Director of the Oil and Gas Cons. Comm's to quash subpoena duces tecum [347-1] and for protective order prohibiting Pltf from examining Dennis Bicknell re: information in returns [347-2] granting Amoco's motion to quash subpoena issued to Dennis Bicknell, Director of Oil and Gas Conservation Commission [350-1] and for protective order that the documents described in such subpoena not be produced [350-2] denying pltf's motion to compel Dennis Bicknell to produce documents in accordance with subpoena duces tecum [358-1] cc: all counsel); entry date: 3/1/93 (gc)
459	3/1/93	RESPONSE by defendant Conoco, Inc. to LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the

Sub #	Date	Description
		subclass of mineral and overriding royaalty owner defts [424-2] (gc) [Entry date 03/02/93]
460	3/1/93	RESPONSE by defendant Conoco, Inc. to LOCC's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1) (gc) [Entry date 03/02/93]
461	3/1/93	RESPONSE by defendant Palo Petroleum, Inc. to LOCC's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1] (gc) [Entry date 03/02/93]
462	3/1/93	RESPONSE by defendant Palo Petroleum, Inc. to LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2] (gc) [Entry date 03/02/93]
463	3/1/93	RESPONSE by defendant Amax Oil & Gas, Inc. to LOCC's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1] (gc) [Entry date 03/02/93]
464	3/1/93	RESPONSE by defts Meridian Oil, Inc., Amax Oil & Gas, Inc., Pablo Operating Co

Sub #	Date	Description
		to LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2] (gc) [Entry date 03/02/93]
465	3/1/93	RESPONSE by defendant Fuel Resources Dev to LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2] (gc) [Entry date 03/02/93]
466	3/1/93	RESPONSE by defendant Amoco Production Co to LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2] (gc) [Entry date 03/02/93]
467	3/1/93	RESPONSE by defendant Amoco Production Co to LOCC's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1] (gc) [Entry date 03/02/93]

Sub #	Date	Description
468	3/1/93	RESPONSE by defendant McKenzie Methane to LOCC's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1] (gc) [Entry date 03/02/93]
469	3/1/93	MINUTE ORDER: by Judge Lewis T. Babcock granting motion for attorney Claudia W. Frost to appear pro hac vice as co-counsel [453-1] (cc: all counsel); entry date: 3/2/93 (gc) [Entry date 03/02/93]
470	3/1/93	MINUTE ORDER: by Judge Lewis T. Babcock granting pltf's motion for leave to file Tribe's brief in response to LOCC's brief in support of motion to give prompt notice to unnamed defendants, to desginate an additional class representative and to amend case management order No. 1 in excess of 10 pages [448-1] (cc: all counsel); entry date: 3/2/93 (gc) [Entry date 03/02/93]
471	3/4/93	RESPONSE by defendant Amoco Production Co to 3/1/93 minute order [457-1] re privilege log (gc) [Entry date 03/05/93]
472	3/5/93	Plf submission of privilege log and RESPONSE by plaintiff Southern Ute Indian to minute order [457-1] (yk) [Entry date 03/08/93]
473	3/5/93	ATTORNEY APPEARANCE for SG Interests I, Ltd, SG Interests II, Ltd by Robert D. Poulson and Alan B. Cameron as co-counsel (gc) [Entry date 03/10/93]
474	3/8/93	MOTION by SG Interests I, Ltd, SG Interests II, Ltd for attorney Mark J. Thurber to appear pro hac vice (gc) [Entry date 03/10/93]

Sub #	Date	Description
475	3/10/93	MINUTE ORDER: by Judge Lewis T. Babcock granting motion for attorney Mark J. Thurber to appear pro hac vice [474-1] (cc: all counsel); entry date: 3/11/93 (gc) [Entry date 03/11/93]
476	3/10/93	ORDER by Magistrate Judge Donald E. Abram. Privilege log submitted pursuant to minute order of 3/1/93 is inadequate. Pltf. to submit new privilege log by 3/19/93 (cc all counsel); entry date: 3/12/93 (gc) [Entry date 03/12/93]
477	3/11/93	REPLY Brief by Landowner Coal Comm to response to motion for order for Pltf to give prompt notice to unnamed defendants [424-1] and motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2] (gc) [Entry date 03/12/93]
478	3/11/93	MOTION by Landowner Coal Comm for leave to file reply brief in support of motion to reform and clarify the court's orders approving the settlement between Markwest, etc. and for leave to file reply brief in support of motion to give prompt notice to unnamed defts, to designate an additional class representative and to amend case management order No. 1 in excess of 10 pages (gc) [Entry date 03/12/93]
479	3/11/93	REPLY Brief by Landowner Coal Comm to response to motion to reform and clarify the court's order approving the settle-

Sub #	Date	Description
		ments between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1] (gc) [Entry date 03/12/93]
491	3/11/93	OBJECTIONS by plaintiff Southern Ute Indian to order of Chief Magistrate Judge Abram filed 3/1/93 [458-1] (gc) [Entry date 04/01/93]
480	3/15/93	Supplemental CERTIFICATE by plaintiff Southern Ute Indian of service of Tribe's Objection under Rule 72(a) FRCP to order of Chief Magistrate Judge Abram, filed 3/1/93 (gc)
481	3/15/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Landowners Coalseam Committee's motion for leave to file reply brief in support of motion to reform and clarify the court's orders approving the settlement between Markwest, etc. and for leave to file reply brief in support of motion to give prompt notice to unnamed defts, to designate an additional class representative and to amend case management order No. 1 in excess of 10 pages [478-1] (cc: all counsel); entry date: 3/15/93 (gc)
482	3/15/93	NOTICE by Colo Oil/Gas Comm of substitution of counsel. Julie D. Wrend will now represent them. (gc) [Entry date 03/16/93]
483	3/16/93	MOTION by plaintiff Southern Ute Indian, defendant Union TX Petroleum to dismiss claims against Union Texas Petroleum Energy Corp. (gc) [Entry date 03/17/93]
484	3/16/93	ORDER by Judge Lewis T. Babcock granting motion to dismiss claims against Union

Sub #	Date	Description
		Texas Petroleum Energy Corp. [483-1]. Claims against Union Texas Petroleum Corp. and Union Texas Petroleum Energy Corporation, successor by merger to Union Texas Petroleum Corp. are dismissed without prejudice and each party to bear its own costs. terminating party Union TX Petroleum (cc: all counsel); entry date: 3/18/93 (gc) [Entry date 03/18/93]
485	3/19/93	NOTICE by defendant Amoco Production Co of taking deposition of JOHN B. GUSTAVSON on 4/6/93 at 8:30 am (gc)
488	3/19/93	Submission of Revised Privilege Log and RESPONSE by plaintiff Southern Ute Indian to order of 3/10/93 [476-1] (gc) [Entry date 03/25/93]
486	3/22/93	RESPONSE by defendant Amoco Production Co to Tribe's Objection Under Rule 72(a) FRCP to order of Chief Mag. Judge Agram filed 3/1/93 [458-1] (gc) [Entry date 03/23/93]
487	3/22/93	NOTICE by defendant Amoco Production Co of taking deposition of JAMES T. COOPER on 3/25/93 at 8:30 am (gc) [Entry date 03/23/93]
489	3/24/93	ORDER by Magistrate Judge Donald E. Abram granting pltf's motion to compel Amoco Production Co. re attorney client privilege and work product immunity [405-1] granting Amoco's motion to compel re: attorney-client privilege [419-1] (cc: all counsel); entry date: 3/25/93 (gc) [Entry date 03/25/93]
490	3/30/93	Joint MOTION by plaintiff Southern Ute Indian, defendant Richmond Petroleum for extension of time for tribe to respond to discovery from Richmond to 4/30/93 (gc) [Entry date 03/31/93]

Sub #	Date	Description
492	3/31/93	Joint MOTION by plaintiff Southern Ute Indian, defendant Fuel Resources Dev for extension of time for Tribe to respond to discovery from Fuel Resources to 5/3/93 (gc) [Entry date 04/02/93]
493	3/31/93	Joint Motion by plaintiff Southern Ute Indian, defendant Conoco, Inc. for dismissal of Conoco, Inc. before Judge Lewis T. Babcock (gc) [Entry date 04/02/93]
494	4/1/93	ORDER by Judge Lewis T. Babcock granting motion for dismissal of Conoco, Inc. before Judge Lewis T. Babcock [493-1] without costs to either party dismissing party Conoco, Inc. (cc: all counsel) entry date: 4/2/93 (gc) [Entry date 04/02/93]
495	4/1/93	Expedited Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co for stay of Order of 3/24/93 by Chief Mag. Judge Abram, and to extend time for filing objections to Order of 3/24/93 (gc) [Entry date 04/02/93]
496	4/2/93	ORDER by Judge Lewis T. Babcock granting motion for stay of Order of 3/24/93 by Chief Mag. Judge Abram [495-1] granting motion to extend time for filing objections to Order of 3/24/93 [495-2]. Order of 3/24/93 granting cross-motions to compel re: attorney/client privilege is stayed until further order of court. [489-1]. Tribe and Amoco to file joint motion re: case management by 4/7/93. Period for filing objections under Rule 72(a) to Order of 3/24/93 is extended for a period of 10 days following entry of an order rejecting the joint motion on case management, should such an order enter by this court. (cc: all counsel); entry date: 4/5/93 (gc) [Entry date 04/05/93]

Sub #	Date	Description
497	4/5/93	ORDER by Magistrate Judge Donald E. Abram granting joint motion for extension of time for Tribe to respond to discovery from Fuel Resources to 5/3/93 [492-1] (cc: all counsel); entry date: 4/6/93 (gc) [Entry date 04/06/93]
498	4/7/93	MOTION (Joint) by plaintiff Southern Ute Indian and defendant Amoco Production Co for order to entry Case Mgmt Order No. 2 (pa) [Entry date 04/09/93]
499	4/8/93	MOTION by Landowner Coal Comm to amend proposed Case Mgmt Order No. 2 (pa) [Entry date 04/09/93]
500	4/8/93	MOTION by Landowner Coal Comm to exceed page limitation of brief in support of motion to amend proposed management order no. 2 (pa) [Entry date 04/09/93]
—	4/8/93	Tendered Brief in support of motion to submitted by plaintiff Southern Ute Indian motion to exceed page limitation of brief in support of motion to amend proposed management order no. 2 [500-1] (pa) [Entry date 04/09/93]
501	4/8/93	MOTION (Request) by SG Interests I, Ltd. and SG Interests II, Ltd to for hearing on motions of Landowners Coalseam Comm. to reform and clarify the court's approving settlement (pa) [Entry date 04/09/93]
502	4/9/93	NOTICE by defendant JM Huber Corporation of attorney change of address of Dugan & Associates (gc) [Entry date 04/12/93]
503	4/12/93	ORDER by Magistrate Judge Donald E. Abram granting joint motion for order to entry Case Mgmt Order No. 2 [498-1]. Joint motion on case management shall be

Sub #	Date	Description
		filed by 4/19/93 (cc: all counsel); entry date: 4/13/93 (gc) Entry date 04/13/93]
504	4/14/93	RESPONSE by defendant Amoco Production Co to Landowner's motion to amend proposed Case Mgmt Order No. 2 [499-1] (gc) [Entry date 04/15/93]
505	4/15/93	ORDER by Judge Lewis T. Babcock setting hearing on Landowners' motion for order for Pltf to give prompt notice to unnamed defendants [424-1], Landowners' motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royalty owner defts [424-2], Landowners' motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1], Landowners' motion for accounting, show cause order and assurances from Palo Petroleum, Inc. re: suspended royalty payments [428-1] at 9:00 5/19/93 (cc: all counsel); entry date: 4/16/93 (gc) [Entry date 04/16/93]
506	4/15/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Landowners' motion to exceed page limitation of brief in support of motion to amend proposed management order no. 2 [500-1] (cc: all counsel); entry date: 4/16/93 (gc) [Entry date 04/16/93]
507	4/15/93	BRIEF by Landowner Coal Comm in support of motion to amend proposed Case Mgmt Order No. 2 [499-1] (gc) [Entry date 04/16/93]
508	4/15/93	ORDER by Judge Lewis T. Babcock. On 4/12/93 Mag. Abram ordered deft Amoco

Sub #	Date	Description
		and other defts to produce names and addresses of landowners to Southern Ute Indian Tribe by 4/19/93, but preserved issue of cost assessment [503-1]. Parties have to 5/14/93 to file briefs addressing effect of this order on Tribe's motion for reconsideration of magistrate's 3/1/93 order [458-1] quashing Tribe's subpoena and granting protective order (cc: all counsel); entry date: 4/19/93 (gc) [Entry date 04/19/93]
509	4/20/93	RESPONSE by plaintiff Southern Ute Indian to LOCC's motion to amend proposed Case Mgmt Order No. 2 [499-1] (gc)
510	4/22/93	Letter (STATEMENT) from Thomas H. Shipps of Maynes, Bradford, Shipps and Sheftel, counsel for plaintiff Southern Ute Indian with Exhibit a to pltf's response to LOCC's motion to amend proposed case management order no. 2 filed 4/20/93 that was inadvertenly omitted. [509-1] (gc)
511	4/22/93	ATTORNEY APPEARANCE for defendant McKenzie Methane as co-counsel by James Parker Rouse Sr. (gc) [Entry date 04/23/93]
512	4/23/93	Joint MOTION by plaintiff Southern Ute Indian, defendant McKenzie Methane for extension of time to obtain certain ratifications to the McKenzie Settlement Agreement (gc)
513	4/23/93	ORDER by Judge Lewis T. Babcock granting joint motion for extension of time to obtain certain ratifications to the McKenzie Settlement Agreement [512-1]. Period of ratification dated 4/16/92 is extended for additional 60 days for those certain individuals identified in said motion. Tribe and McKenzie granted additional period of 60

Sub #	Date	Description
		days to prepare and submit special ratification of settlement agreement re: work interests claimed (cc: all counsel); entry date: 4/23/93 (gc)
514	4/23/93	Joint MOTION by plaintiff Southern Ute Indian, defendant Markwest Energy Prt for extension of time to obtain ratifications of settlement agreement to 8/4/93 (gc)
515	4/26/93	ORDER by Judge Lewis T. Babcock granting motion for extension of time to obtain ratifications of settlement agreement between Tribe and MarkWest to 8/4/93 [514-1] (cc: all counsel); entry date: 4/26/93 (yk)
516	4/27/93	CASE MANAGEMENT ORDER No. 2 by Judge Lewis T. Babcock re [230-2] re [498-1]; Disp Motion ddl 8/26/93 (cc: all counsel); entry date: 4/28/93 (gc) [Entry date 04/28/93]
517	4/28/93	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co to Chief Magistrate Judge Abram for order to approve revised notice of pendency of class action and of class members (gc) [Entry date 04/29/93]
518	4/28/93	ORDER by Magistrate Judge Donald E. Abram granting joint motion to Chief Magistrate Judge Abram for order to approve revised notice of pendency of class action and of class members [517-1] (cc: all counsel); entry date: 4/29/93 (gc) [Entry date 04/29/93]
519	4/29/93	LETTER to court from James W. Wilson advising he supports a court order that 2% of the royalties from properties be set aside into fund for payment of atty fees and litigation expenses. (gc)

Sub #	Date	Description
520	5/3/93	RESPONSE by plaintiff Southern Ute Indian, defendant Amoco Production Co to order [508-1] of 4/15/93 (c) [Entry date 05/04/93]
521	5/6/93	LETTER to court from Kitty King Powell and Kity King Powell Maritial Trust re: setting aside a portionof the royalties to fund for payment of attorneys' fees and expenses of deft. class (gc) [Entry date 05/10/93]
522	5/6/93	RESPONSE by Landowner Coal Comm to SG Interests' motion for hearing on motions of Landowners Coalseam Comm. to reform and clarify the court's approving settlement [501-1] (gc) [Entry date 05/10/93]
522	5/6/93	MOTION (Request) by Landowner Coal Comm for an early decision re: LOCC's motion to give prompt notice to unnamed defts, to designate an additional class representative and to amend case management order No. 1 (gc) [Entry date 05/10/93]
523	5/10/93	Motion Objection (RESPONSE) by defendant Conoco, Inc. to pending motions filed by Landowners Coalseam Committee and Requesting Appearance (motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1], motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of

Sub #	Date	Description
		mineral and overriding royalty owner defts [424-2]) (gc) [Entry date 05/11/93]
524	5/10/93	Motion Objecting (RESPONSE) by defendant Palo Petroleum, Inc. to Landowners Coalseam Committee's Motions and Notice of Appearance (motion for accounting, show cause order and assurances from Palo Petroleum, Inc. re: suspended royalty payments [428-1], motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1], motion for order for Pltf to give prompt notice to unnamed defendants [424-1], motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royalty owner defts [424-2]) (gc) [Entry date 05/11/93]
525	5/18/93	Renewal (AMENDMENT) by Ralph Wheeler, C. E. Wheeler to motion to intervene [218-1], motion for order designating intervenors as class representatives. [218-2] (gc)
526	5/18/93	Objection (RESPONSE) by CO Dept. of Transportation to LOCC's motion to represent CDOT and to establish fund [424-2] (gc) [Entry date 05/20/93]
528	5/19/93	COURTROOM MINUTES by Judge Lewis T. Babcock. Arguments . . . exhibits. The motion to designate an additional class representative is denied and request to have

Sub #	Date	Description
		2% withheld from royalties is moot (part of doc #424) and taking under advisement on 5/19/93 the amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts (part of [424-2]), denying Landowner's motion to reform and clarify the court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1]. Case further referred to Mag. Abram to work with parties to establish benchmark form or protocol for submission of future settlement agreements. Pltf. to submit to court and Landowners the mailing list received from Amoco. List to remain confidential. Pltf to submit under seal the mailing list they received from all others. Lists to remain confidential. Court conditionally approves settlement agreement with Pltf. and SG 1 and Bellsouth, pending SG I's agreement to delete last sentence of paragraph 9.04. Court will review pltf's motion to amend [323-1]. Finding the Landowner's motion for accounting, show cause order and assurances from Palo Petroleum, Inc. re: suspended royalty payments [428-1] withdrawn without prejudice (moot) (Exhibit list and exhibits attached).; entry date: 5/21/93 (gc) (Entry date 05/21/93]
527	5/20/93	LETTER to court from Stanley E. Neely re: request for court order that 2% of royalties be placed in fund for atty fees and expenses. (gc)

Sub #	Date	Description
529	5/20/93	ORDER by Judge Lewis T. Babcock that the motion to approve settlement agreement and to dismiss claims against SG Interests I, Ltd. and Bellsouth Corp Health Care Trust before Judge Lewis T. Babcock. [418-1] is submitted. The settlement agreement will be approved, conditioned on the removal of the last sentence of paragraph f 04 of Article IX and is incorporated as part of this order. Parties to settlement agreement shall have 30 days to submit to the court notice of their consent to the above stated condition. Upon final approval, parties to make diligent efforts to notify persons/entities eligible to ratify settlement agreement, etc. (cc: all counsel) ; entry date: 5/21/93 (gc) [Entry date 05/21/93]
530	5/20/93	ORDER by Judge Lewis T. Babcock granting Tribe's motion to amend complaint (to correct errors in names of certain defts, substitute trustees of trusts in place of individual defts, delete names of other defts and add defts) [323-1] (cc: all counsel) ; entry date: 5/21/93 (gc) [Entry date 5/21/93]
532	5/20/93	First AMENDED COMPLAINT [1-1] by plaintiff Southern Ute Indian terminating defendant Leta M. Adkins, defendant Horace F. Buchanan, defendant Joseph C. Ciancio, defendant A. B. Crosby, defendant Barbara Crosby, defendant David Crosby, defendant Manuel Cruz, defendant Minnie Flaks, defendant Adele Frost, defendant Hondo Oil & Gas Co, defendant Richard C. Malcomb, defendant Mabel McElvain, defendant W Clay Meredith Trst, defendant Roy E. Montgomery, defendant Clinton I.

Sub #	Date	Description
		Smullyen, defendant Benton E. Smullyen, defendant Albert E. Zarlengo, defendant Kelly Cox, defendant Christine Hamilton, defendant W. E. Rennie, defendant George C. Vance; adding ARCO Oil and Gas Co., Jack Balle, Mary Jean Balle, Donald C. Ciancio, Susie M. Ciancio, NCNB Texas Natl Bk, Addie G. Crosby, Jack W. Crosland Jr., Henry L. Enochson, Mary Jane Enochson, J. L. Goggans, Liberty Tulsa, Helen Crosland Hendricks, Thomas L. Johnstone, James Eric Kaindl, Larry James Kaindl, Lisa Jean Kaindl, Jane P. Mosbacher, PM Associates, First Intrst Bk Dnvr, Roderick L. Turner, Wells Fargo Bank, Albert E. Zarlengo Jr., Bell So Corp Trst, J. Magness, Inc., SG Interests I, Ltd (gc) [Entry date 05/25/93]
531	5/21/93	LETTER to court from J.M. Nash, Jr., Pyramid Trust to court regarding notice of hearing on 5/19/93 he recently received. (gc) [Entry date 05/25/93]
533	5/24/93	ORDER by Judge Lewis T. Babcock denying LOCC's motion for order for Pltf to give prompt notice to unnamed defendants [424-1] denying LOCC's motion to designate an additional class representative and amend case management order No. 1 to name Landowner Coalseam Committee as class representative for the subclass of mineral and overriding royaalty owner defts [424-2]. Tribe to submit under seal to court and to LOCC its mailing list of Amoco's mineral owners and overriding royalty owner defts and mailing lists of all other deft oil companies' mineral and overriding royalty owners. Denying LOCC's motion to reform and clarify the

Sub #	Date	Description
		court's order approving the settlements between the Southern Ute Indian Tribe and Markwest Energy, McKenzie Methan, SG Interests II, SG Interests I and Bellsouth Corp. [421-1], Issue of future settlement agreements referred to Mag. Abram who will act ac settlement master . . . granting LOCC's motion to withdraw without prejudice its motion for accounting, show cause order and assurances from Palo Petroleum, Inc. re: suspended royalty payments [428-1] (cc: all counsel); entry date: 5/26/93 (gc) [Entry date 05/26/93]
534	5/25/93	NOTICE by defendant Amoco Production Co of taking deposition of STEPHEN L. BEND on 6/7/93 at 10:00 am (gc) [Entry date 05/26/93]
535	5/25/93	NOTICE by defendant Amoco Production Co of taking deposition of CLARENCE L. HARR on 6/17/93 at 9:30 am (gc) [Entry date 05/26/93]
536	5/25/93	NOTICE by defendant Amoco Production Co of taking deposition of J. CRAIG CREEL on 6/1/93 at 10:00 am (gc) [Entry date 05/26/93]
537	5/26/93	ANSWER by defendant Amoco Production Co to first amended complaint [532-1] (gc) [Entry date 06/01/93]
538	5/27/93	RESPONSE by defendant Richmond Petroleum to order [533-1] dated 5/24/93 regarding submittal of mailing lists (gc) [Entry date 06/01/93]
539	5/28/93	MOTION by defts Meridian Oil, Inc., Amax Oil & Gas, Inc., Pablo Operating Co for order for modification of order dated 5/24/93 (gc) [Entry date 06/01/93]

Sub #	Date	Description
540	5/28/93	ANSWER by Defts Meridian Oil, Inc., Amax Oil & Gas, Inc., Pablo Operating Co to First Amended complaint [532-1] (gc) [Entry date 06/01/93]
541	5/28/93	ANSWER by defendant Richmond Petroleum First Amended complaint [532-1] (gc) [Entry date 06/01/93]
542	5/28/93	ORDER by Judge Lewis T. Babcock denying Ralph Wheeler and C.E. Wheeler's motion to intervene [218-1] and motion for order designating intervenors as class representatives. [218-2] (cc: all counsel); entry date: 6/1/93 (gc) [Entry date 06/01/93]
543	6/1/93	OBJECTIONS by defendant Fuel Resources Dev, defendant Natl Coop Refinery to release of ownership lists (re order [533-1] of 5/24/93) (gc) [Entry date 06/02/93]
544	6/1/93	ANSWER by defendant North Central Oil to first amended complaint [532-1] (gc) [Entry date 06/02/93]
545	6/1/93	ANSWER by defendant Mobil Oil Corp to first amended complaint [532-1] (gc) [Entry date 06/02/93]
546	6/2/93	MINUTE ORDER: by Judge Lewis T. Babcock. Responses due by 6/16/93 to motion of Meridian, et al for modication of order dated 5/24/93 [539-1] (cc: all counsel); entry date: 6/2/93 (gc)
547	6/7/93	JOINDER by defendant Amoco Production Co in motion for order for modification of order dated 5/24/93 [539-1] (gc) [Entry date 06/08/93]
550	6/8/93	ANSWER by defendant Bowen/Edwards Assoc complaint [532-1] (gc) [Entry date 06/09/93]

Sub #	Date	Description
551	6/8/93	ANSWER by defendant Tiffany Gas Company to 1st amended complaint [532-1] (gc) [Entry date 06/09/93]
548	6/9/93	MINUTE ORDER: by Magistrate Judge Donald E. Abram; mag conference set at 3:30 6/22/93 (cc: all counsel); entry date: 6/9/93 (yk)
549	6/9/93	Certication of Publication and NOTICE by plaintiff Southern Ute Indian w/exhibits FILED UNDER SEAL, PLACED IN VAULT (yk)
552	6/10/93	ANSWER by defendant Northwest Pipeline, defendant Williams Production first amended complaint [532-1] (pa) [Entry date 06/11/93]
553	6/14/93	Joint MOTION by Landowner Coal Comm, Southern Ute Indian, Northwest Pipeline to Chief Judge Abram to review Palo Settlement Agreement (gc) [Entry date 06/15/93]
554	6/15/93	Motion by defendant Amoco Production Co for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock, and for leave to file brief in excess of ten pages before Judge Lewis T. Babcock (gc) [Entry date 06/16/93]
555	6/15/93	BRIEF by defendant Amoco Production Co in support of motion for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1] (Bound Volume) (gc) [Entry date 06/16/93]
556	6/15/93	APPENDIX filed by defendant Amoco Production Co of Exhibits containing CON-

Sub #	Date	Description
		FIDENTIAL OR HIGHLY CONFIDENTIAL information re brief in support of its motion for summary judgment on the class action claim and the class action defenses [555-1] (PLACED IN VAULT) (gc) [Entry date 06/16/93]
557	6/15/93	APPENDIX (Volume I) filed by defendant Amoco Production Co re brief in support of its motion for summary judgment on class action claim and class action defenses [555-1] (Bound volume) (gc) [Entry date 06/16/93]
558	6/15/93	APPENDIX (Volume II) filed by defendant Amoco Production Co re brief in support of its motion for summary judgment on the class action claim and class action defenses [555-1] (Bound Volume) (gc) [Entry date 06/16/93]
559	6/15/93	APPENDIX (Volume III) filed by defendant Amoco Production Co re brief in support of its motion for summary judgment on the class action claim and class action defenses [555-1] (Bound Volume) (gc) [Entry date 06/16/93]
560	6/16/93	SUPPLEMENTAL concurrence by defendant Palo Petroleum, Inc. in joint motion to Chief Judge Abram to review Palo Settlement Agreement [553-1] (gc) [Entry date 06/17/93]
561	6/17/93	RESPONSE by Landowner Coal Comm to Meridian Oil, et al's motion for order for modification of order dated 5/24/93 [539-1] (gc)
561	6/17/93	RESPONSE by Landowner Coal Comm to Fuel Resources and Nat'l Cooperative ob-

Sub #	Date	Description
		jection to release of ownership lists [543-1] (gc)
562	6/17/93	Motion by plaintiff Southern Ute Indian, defendant Pablo Operating Co to dismiss claims against Pablo Operating Co and certain other claims before Judge Lewis T. Babcock (yk)
563	6/17/93	ANSWER by defendant Phillips Petroleum to amended complaint [532-1] (yk)
564	6/17/93	Notice (STATEMENT) by defendant SG Interests I, Ltd, plaintiff Southern Ute Indian of consent to conditional approval of settlement of pltf and deft SG and Bellsouth re [529-1], [418-1] (gc) [Entry date 06/18/93]
565	6/18/93	Supplemental Certification of Notification with Exhibits Under SEAL by plaintiff Southern Ute Indian (Placed in Vault) (gc)
566	6/22/93	MOTION by defendant Palo Petroleum, Inc. for attorney Mark J. Thurber and Claudia W. Frost to appear pro hac vice (gc) [Entry date 06/23/93]
567	6/22/93	Stipulation and MOTION by Landowner Coal Comm, Amoco Production Co, Meridian Oil, Inc., Amax Oil & Gas, Inc., Pablo Operating Co, Fuel Resources Dev, Natl Coop Refinery for modication of 5/24/93 order re: release of mailing lists (gc) [Entry date 06/23/93]
568	6/22/93	ORDER by Judge Lewis T. Babcock granting motion for attorney Mark J. Thurber and Claudia W. Frost to appear pro hac vice [566-1] (cc: all counsel); entry date: 6/24/93 (gc) [Entry date 06/24/93]

Sub #	Date	Description
569	6/23/93	ORDER by Judge Lewis T. Babcock granting Amoco's motion for leave to file brief in excess of ten pages before Judge Lewis T. Babcock [554-2] (cc: all counsel); entry date: 6/24/93 (gc) [Entry date 06/24/93]
570	6/24/93	ORDER by Judge Lewis T. Babcock granting motion to approve settlement agreement and to dismiss claims against SG Interests I, Ltd. and Bellsouth Corp Health Care Trust before Judge Lewis T. Babcock. [418-1]. Except for last sentence of paragraph 9.04 of Article IX, the settlement agreement is approved and incorporated as part of this order. All claims of pltf. against SG Interests I, Ltd and BellSouth Corp. Health Care Trust are dismissed with prejudice. Partes to make diligent efforts to notify persons or entities eligible to ratify agreement. terminating party SG Interests I, Ltd, party Bell So Corp Trst (cc: all counsel); entry date: 6/24/93 (gc)
571	6/24/93	ORDER by Judge Lewis T. Babcock granting motion to dismiss claims against Pablo Operating Co and certain other claims before Judge Lewis T. Babcock [562-1]. As to certain lands (see order for detail), the Tribe's claims in complaint are dismissed with prejudice. Those persons claiming an interest in coalbed methane development in said lands are similarly dismissed with prejudice only insofar as their claimed interests are located within said spacing units. Patricia Penrose Schieffer and the Trust U/D Donaldson Brown and other persons named in exhibit (attached to order) claiming such interests are similarly

Sub #	Date	Description
		dismissed with prejudice only insofar as their claimed interests subject to this case are located within said spacing units. All parties to bear their own costs and fees, terminating party Pablo Operating Co (cc: all counsel); entry date: 6/24/93 (gc)
572	6/24/93	ORDER by Judge Lewis T. Babcock granting motion for modification of 5/24/93 order re: release of mailing lists [567-1] (cc: all counsel); entry date: 6/25/93 (yk) [Entry date 06/25/93]
573	6/28/93	LETTER to court from counsel for defendant Conoco, Inc. requesting that he be removed from mailing list as Conoco was dismissed on 4/1/93 (gc) [Entry date 06/29/93]
574	6/29/93	TRANSCRIPT of proceedings of Hearing on Motions dated 5/19/93 before Judge Babcock (170 pages) (Cert. Copy) (dh) [Entry date 06/30/93]
575	7/6/93	Supplemental EXHIBITS by Amoco Prod Co. to be added to Appendix III [559-1] filed with the brief in support of [555-1] Amoco's motion for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1]. (sh) [Entry date 07/07/93]
576	7/7/93	Supplemental CERTIFICATION of Notification (of Class Members) With Exhibits by plaintiff Southern Ute Indian—FILED UNDER SEAL and PLACED IN THE VAULT. (sh)
577	7/9/93	MOTION by plaintiff Southern Ute Indian to extend time to file its response to Amoco's Motion for Summ Judgment, and

Sub #	Date	Description
		to extend time to file its cross-motion for summ judgment. (sh)
578	7/13/93	Supplemental CERTIFICATE of Service by plaintiff Southern Ute Indian re Pltfs' Request for Extension of time to File its Response to Amoco's Motion for Summ Judgment & to File its Cross-Motion for Summ Judgment—copy mailed to the Southern Ute Indian Tribe. (sh)
579	7/14/93	Motion by Federal Defendants to dismiss this action as time-barred by 28 U.S.C. Sec. 2401 before Judge Lewis T. Babcock, or, alternatively, for summary judgment that, inter alia, Plf Tribe does not own the coalbed methane before Judge Lewis T. Babcock, and to exceed page limitation. (sh)
580	7/14/93	BRIEF by Federal Defendants in support of Federal Defts' motion to dismiss this action as time-barred by 28 U.S.C. Sec. 2401 before Judge Lewis T. Babcock [579-1], motion for summary judgment that, inter alia, Plf Tribe does not own the coalbed methane before Judge Lewis T. Babcock [579-2]. (sh)
581	7/16/93	ORDER by Judge Lewis T. Babcock granting pltf's motion to extend time to file its response to Amoco's Motion for Summ Judgment [577-1] to 9/7/93 granting pltf's motion to extend time to file its cross-motion for summ judgment. [577-2] to 9/7/93 re [554-1] (cc: all counsel); entry date: 7/20/93 (gc) [Entry date 07/20/93]
582	7/16/93	MINUTE ORDER: by Judge Lewis T. Babcock. Pltf has to 9/7/93 to respond to Federal Defts' Motion to Dismiss Action as Time-Barred [579-1] or in the Alterna-

Sub #	Date	Description
		tive for Summary Judgment [579-2], granting Federal Defts' motion to exceed page limitation. [579-3]. Brief is accepted for filing. (cc: all counsel); entry date: 7/20/93 (gc) [Entry date 07/20/93]
583	7/19/93	ORDER by Magistrate Judge Donald E. Abram. Pltf to promptly release all mineral owners names and addresses, supplied by Deft. Oil Companies, to LOCC to be maintained in accordance with court's previous orders. (cc: all counsel); entry date: 7/20/93 (gc) [Entry date 07/20/93]
584	7/19/93	ORDER OF SETTLEMENT MASTER by Magistrate Judge Donald E. Abrams. Palo settlement Agreement is approved as to form, subject to ultimate approval by Judge Babcock. re [553-1] (cc: all counsel); entry date: 7/20/93 (gc) [Entry date 07/20/93]
585	8/6/93	ORDER by Judge Lewis T. Babcock granting motion to review Palo Settlement Agreement [553-1] Settlement agreement between Tribe and Palo Petroleum is approved and incorporated as part of this order. All claims of Tribe against Palo are dismissed with prejudice. Tribe and Palo to make diligent efforts to notify persons or entities eligible to ratify settlement agreement. terminating party Palo Petroleum, Inc. (cc: all counsel); entry date: 8/9/93 (gc) [Entry date 08/09/93]
586	9/7/93	Motion by plaintiff Southern Ute Indian for summary judgment before Judge Lewis T. Babcock (gc) [Entry date 09/08/93]
586	9/7/93	RESPONSE by plaintiff Southern Ute Indian to Amoco's motion for summary judg-

Sub #	Date	Description
		ment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1], and Federal Defts' motion to dismiss this action as time-barred by 28 U.S.C. Sec. 2401 before Judge Lewis T. Babcock [579-1] or in the alternative for motion for summary judgment that, inter alia, Plf Tribe does not own the coalbed methane before Judge Lewis T. Babcock [579-2] (gc) [Entry date 09/08/93]
587	9/7/93	MOTION by plaintiff Southern Ute Indian for leave to file brief in support of Tribe's cross motion for summary judgment and response to Amoco's motion for summary judgment and response to Federal Defts' alternative motion to dismiss or for summary judgment in excess of 10 pages (gc) [Entry date 09/08/93]
588	9/7/93	CERTIFICATE by plaintiff Southern Ute Indian of mailing of Brief in Support of Tribe's Motion for Summary Judgment, etc. on 9/7/93 (gc) [Entry date 09/08/93]
589	9/7/93	BRIEF by plaintiff Southern Ute Indian in support of motion for summary judgment before Judge Lewis T. Babcock [586-1] (Filed under SEAL, along with Volumes 1 through 6 (10 total separate envelopes)—placed in VAULT) (NOTE: Per Stip and Order granting it 7/11/94, this brief is now UNSEALED and the brief & volumes 1-6 have been transferred to the EXHIBIT ROOM.) (gc) [Entry date 09/08/93] [Edit date 07/13/94]
589	9/7/93	BRIEF by plaintiff Southern Ute Indian in opposition to Amoco's motion for summary judgment on the class action claim and the class action defenses before Judge Lewis

Sub #	Date	Description
		T. Babcock [554-1] and Federal Defts' motion to dismiss this action as time-barred by 28 U.S.C. Sec. 2401 before Judge Lewis T. Babcock [579-1], or in the alternative motion for summary judgment that, inter alia, Plf Tribe does not own the coalbed methane before Judge Lewis T. Babcock [579-2] (Filed under SEAL—along with volumes 1 through 6 (consisting of 10 separate envelopes)—placed in Vault) (Per Stip granted 7/11/94, this brief and volumes 1-6 are now UNSEALED and this box has been transferred to the EXHIBIT ROOM.) (gc) [Entry date 09/08/93] [Edit date 07/13/94]
590	9/7/93	ORDER by Judge Lewis T. Babcock granting Tribe's motion for leave to file brief in support of Tribe's cross motion for summary judgment and response to Amoco's motion for summary judgment and response to Federal Defts' alternative motion to dismiss or for summary judgment in excess of 10 pages [587-1] (cc: all counsel); entry date: 9/9/93 (gc) [Entry date 09/09/93]
591	9/8/93	Unopposed MOTION by defendant Amoco Production Co for leave to file combined reply and response brief to summary judgment motions (gc) [Entry date 09/09/93]
592	9/9/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Amoco's unopposed motion for leave to file combined reply and response brief to summary judgment motions [591-1]. Brief due 10/18/93 (cc: all counsel); entry date: 9/14/93 (gc) [Entry date 09/14/93]

Sub #	Date	Description
593	9/20/93	Unopposed MOTION by Federal defendants for enlargement of time to respond to pltf's response brief and cross-motions to dismiss and for summary judgment to 10/18/93 (gc) [Entry date 09/21/93]
594	9/21/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Federal Defts' motion for enlargement of time to respond to pltf's response brief and cross-motions to dismiss and for summary judgment to 10/18/93 [593-1] (cc: all counsel); entry date: 9/21/93 (gc)
595	9/23/93	Unopposed MOTION by defendant Richmond Petroleum for leave to file combined reply and response brief re: motions for summary judgment (gc) [Entry date 09/24/93]
596	9/23/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Richmond Petroleum's motion for leave to file combined reply and response brief re: motions for summary judgment [595-1]. Brief is due 10/18/93 (cc: all counsel); entry date: 9/24/93 (gc) [Entry date 09/24/93]
597	9/24/93	Unopposed MOTION by Landowner Coal Comm for leave to file combined reply and response brief re: motions for summary judgment (gc)
598	9/24/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Land Owners Coalseam Comm's motion for leave to file combined reply and response brief re: motions for summary judgment [597-1]. Brief due 10/18/93 (cc: all counsel); entry date: 9/24/93 (gc)

Sub #	Date	Description
599	9/27/93	MANDATE from the Court of Appeals; CA # 92-1201; Dt issued 9/27/93; JUDGMENT dated 8/10/93 reversing the order requiring the Tribe to pay to defts 25% of costs already expended by defts to acquire necessary business information and remanding for further proceedings. [Appeal [296-1] (gc) [Entry date 09/28/93]
611	9/27/93	Unopposed MOTION by defendant Amoco Production Co for second extension of time to 11/9/93 to file combined reply & response brief. (sh) [Entry date 10/28/93]
600	10/5/93	MOTION by defendant Amoco Production Co to extend time to 11/3/93 to file combined reply & response brief. (sh)
601	10/5/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Amoco's motion to extend time to 11/3/93 to file combined reply & response brief [600-1]. (cc: all counsel); entry date: 10/5/93 (sh)
602	10/13/93	MOTION by defendant Richmond Petroleum to extend time to 11/3/93 to file Combined reply & response brief to Tribe's Motion for Summ Judgment & Amoco's Motion for Summ Judgment & response to Federal Defts' alternative motion to dismiss or for summ judgment. (sh) [Entry date 10/14/93]
603	10/14/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Richmond Petroleum's motion to extend time to 11/3/93 to file Combined reply & response brief to Tribe's Motion for Summ Judgment & Amoco's Motion for Summ Judgment & response to Federal Defts' alternative motion to dismiss or for summ judgment [602-1]. (cc: all counsel); entry date: 10/14/93 (sh)

Sub #	Date	Description
604	10/14/93	MOTION by Federal Defts Manuel Lujan Jr., DOI, BIA, BLM, Minerals Mgt Service to extend time to 11/3/93 to respond to Plf's Response & Cross-Motion. (sh) [Entry date 10/15/93]
605	10/15/93	MOTION by Land Owners Coalseam Committee to extend time to 11/3/93 to file Combined Reply & Response Brief. (sh)
606	10/15/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Federal Defts' motion to extend time to 11/3/93 to respond to Plf's Response & Cross-Motion [604-1]. (cc: all counsel); entry date: 10/15/93 (sh)
607	10/15/93	ATTORNEY SUBSTITUTION: terminating attorney Frederick Lee Douglas/Kelly Stansfield & O'Donnell for Natl Coop Refinery, and Fuel Resources Dev and substituting attorney Charles Carpenter (with new address). (sh)
608	10/15/93	Unopposed MOTION by defendant Fuel Resources Dev to extend time to 11/3/93 to file response brief. (sh)
609	10/15/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Land Owners Coalseam's motion to extend time to 11/3/93 to file Combined Reply & Response Brief [605-1]. (cc: all counsel); entry date: 10/18/93 (sh) [Entry date 10/18/93]
610	10/15/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Fuelco's motion to extend time to 11/3/93 to file response brief [608-1]. (cc: all counsel); entry date: 10/18/93 (sh) [Entry date 10/18/93]

Sub #	Date	Description
612	10/28/93	MINUTE ORDER: by Judge Lewis T. Babcock granting Amoco's motion for second extension of time to 11/9/93 to file combined reply & response brief [611-1]. (cc: all counsel); entry date: 10/28/93 (sh)
613	11/1/93	MOTION by plaintiff Southern Ute Indian for leave to lodge executed Palo Petroleum, Inc. Settlement Agreement with the Court. (sh)
614	11/4/93	ORDER by Judge Lewis T. Babcock granting motion for leave to lodge executed Palo Petroleum, Inc. Settlement Agreement with the Court. [613-1] (cc: all counsel); entry date: 11/8/93 (yk) [Entry date 110893]
615	11/9/93	REPLY and Response by defendant Richmond Petroleum to response to motion for summary judgment before Judge Lewis T. Babcock [586-1], motion for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1] (pa) [Entry date 11/10/93]
616	11/9/93	MOTION by federal defts to exceed page limitation (pa) [Entry date 11/10/93]
617	11/9/93	RESPONSE by defendant Manuel Lujan Jr. to motion for summary judgment before Judge Lewis T. Babcock [586-1] (pa) [Entry date 11/10/93]
617	11/9/93	REPLY by defendant Manuel Lujan Jr. to response to motion for summary judgment that, inter alia, Plf Tribe does not own the coalbed methane before Judge Lewis T. Babcock [579-2] (pa) [Entry date 11/10/93]
618	11/9/93	MOTION by defendant Fuel Resources Dev to exceed page limitation -brief responding to mtn for sum jug (pa) [Entry date 11/10/93]

Sub #	Date	Description
619	11/9/93	RESPONSE by defendant Fuel Resources Dev to Tribe's motion for summary judgment before Judge Lewis T. Babcock [586-1] (pa) [Entry date 11/10/93]
620	11/9/93	MOTION by defendant Amoco Production Co to exceed page limitation - combined reply and response brief (pa) [Entry date 11/10/93]
621	11/9/93	REPLY by defendant Amoco Production Co to response to motion for summary judgment before Judge Lewis T. Babcock [586-1] (Combined Reply and Response Brief, bound volume, 189 pages) (pa) [Entry date 11/10/93] [Edit date 11/10/93]
621	11/9/93	RESPONSE in support by defendant Amoco Production Co to motion for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1] (Combined Reply and Response Brief, bound volume) (pa) [Entry date 11/10/93] [Edit date 11/10/93]
622	11/9/93	APPENDIX VOLUME I filed by defendant Amoco Production Co re motion response [621-1], re motion reply [621-], (bound volume, (pa) [Entry date 11/10/93]
623	11/9/93	APPENDIX VOLUME II filed by defendant Amoco Production Co re motion response [621-1], re motion reply [621-1] (bound volume) (pa) [Entry date 11/10/93]
624	11/9/93	SECOND APPENDIX OF exhibits filed by defendant Amoco Production Co containing confidential or highly confidential information submitted separately FILED UNDER SEAL re motion response [621-1], re motion reply [621-1] PLACED IN VAULT (pa) [Entry date 11/10/93]

Sub #	Date	Description
625	11/10/93	MOTION by Landowners Coalseam for order to give prompt notice to unnamed defendants (yk) [Entry date 11/12/93]
626	11/10/93	MOTION by Landowners Coalseam to amend case management order no. 1 (yk) [Entry date 11/12/93]
627	11/10/93	Motion by Landowners Coalseam to dismiss action as time barred; for lack of jurisdiction and alternatively for Mineral Owner defs on class action claim and class action defenses before Judge Lewis T. Babcock and for leave to file brief in excess of 10 pages (yk) [Entry date 11/12/93]
628	11/10/93	CERTIFICATE of mailing by Landowners Coalseam (yk) [Entry date 11/12/93]
629	11/10/93	REPLY by Landowners Coalseam to response to motion for summary judgment that inter alia, Plf Tribe does not own the coalbed methane before Judge Lewis T. Babcock [579-2], motion for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1] (yk) [Entry date 11/12/93]
629	11/10/93	RESPONSE by Landowners Coalseam to motion for summary judgment before Judge Lewis T. Babcock [586-1] (yk) [Entry date 11/12/93]
629	11/10/93	BRIEF by Landowners Coalseam in support of motion to dismiss action as time barred; for lack of jurisdiction and alternatively for Mineral Owner defs on class action claim and class action defenses before Judge Lewis T. Babcock [627-1], motion to amend case management order no. 1 [626-1] (yk) [Entry date 11/12/93] [Edit date 10/24/94]

Sub #	Date	Description
630	11/10/93	EXHIBITS 1-13 for motion response [629-1], motion reply [629-1], brief [629-1] (yk) [Entry date 11/12/93]
631	11/10/93	MINUTE ORDER: by Judge Lewis T. Babcock regarding [627-1] mtn to file excess pages granted (cc: all counsel); entry date: 11/12/93 (yk) [Entry date 11/12/93]
632	11/10/93	ORDER by Judge Lewis T. Babcock granting motion to exceed page limitation -brief responding to mtn for sum jug [618-1] (cc: all counsel); entry date: 11/12/93 (yk) [Entry date 11/12/93]
633	11/10/93	ORDER by Judge Lewis T. Babcock granting motion to exceed page limitation [616-1] (cc: all counsel); entry date: 11/12/93 (yk) [Entry date 11/12/93]
634	11/10/93	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to exceed page limitation - combined reply and response brief [620-1] (cc: all counsel); entry date: 11/12/93 (yk) [Entry date 11/12/93]
635	11/10/93	MINUTE ORDER: by Judge Lewis T. Babcock denying motion to amend case management order no. 1 [626-1] (cc: all counsel); entry date: 11/12/93 (yk) [Entry date 11/12/93]
636	11/15/93	LETTER to court from VivianGuilford of Colo Atty Gen requesting removal of Ms. Charlotte Robinson from mailing list (yk)
637	11/23/93	Unopposed MOTION by plaintiff Southern Ute Indian to extend to file reply brief re Tribe's Cross Motion for Sum Judgment (pa) [Entry date 11/24/93]
638	11/23/93	ORDER by Judge Lewis T. Babcock granting motion to extend to file reply brief re

Sub #	Date	Description
		Tribe's Cross Motion for Summary Judgment to 1/18/94 [637-1] (cc: all counsel); entry date: 11/24/93 (pa) [Entry date 11/24/93]
639	12/2/93	Joint MOTION by plaintiff Southern Ute Indian, defendant Markwest Energy Prt and Land Owners Coalseam Committee for order to approve Landowner Ratification of Markwest Settlement Agreement. (sh)
640	12/3/93	BRIEF FILED by plaintiff Southern Ute Indian—Memorandum to Chief Magistrate Abram in Support of Disclosure of Federal Defts' Documents Submitted for In Camera Review. (sh) [Entry date 12/06/93]
641	1/5/94	Second MOTION by plaintiff Southern Ute Indian to extend time to 2/22/94 for filing Plf's reply brief or briefs. (sh)
642	1/5/94	ORDER by Judge Lewis T. Babcock granting Plf's motion to extend time to 2/22/94 for filing Plf's reply brief or briefs [641-1]. (cc: all counsel); entry date: 1/6/94 (sh) [Entry date 01/06/94]
643	1/10/94	ORDER—upon in camera review of documents by Magistrate Judge Donald E. Abram — the 3/28/90 memorandum, the draft 1990 opinions, and the 3/18/93 memorandum from Young & Aguilar to BIA solicitor are to be produced to counsel for Plf. The remaining documents need not be produced. (cc: all counsel); entry date: 1/10/94 (sh)
644	1/10/94	MAGISTRATE'S RECOMMENDATION by Magistrate Judge Donald E. Abram recommending that the joint motion for order to approve Landowner Ratification of Markwest Settlement Agreement [639-1]

Sub #	Date	Description
		be approved. Also recommended that MarkWest be ordered to submit the cover letter & MarkWest Ratification to each mineral/royalty owner deft who owns an interest in MarkWest's leaseholds subject to this litigation, to be returned by 3/31/94. Parties given 10 days to file written objections to this Recommendation. (cc: all counsel); entry date: 1/10/94 (sh)
645	1/14/94	LETTER to court from Vivian Guilford, Admin Asst for Natural Resources Section, State of Colo requesting that her name be removed from the Certificate of Mailing in this case. (sh)
646	1/28/94	ORDER by Judge Lewis T. Babcock adopting [644-1] Magistrate's Recommendation; APPROVING [639-1] Land Owner Coalseam Committee/Southern Ute Indian Tribe/MarkWest Energy's motion for order to approve Landowner Ratification of Markwest Settlement Agreement. MarkWest to submit Cover Letter & Ratification to each mineral/royalty owner deft who owns an interest in MarkWest's leaseholds subject to this litigation. Time period for execution/return by the owners extended through 3/31/94. Upon execution & return to MarkWest, this Ratification shall supersede/replace previous ratifications executed by that mineral/royalty owner. (cc: all counsel); entry date: 2/1/94 (sh) [Entry date 02/01/94]
647	2/22/94	MOTION by plaintiff Southern Ute Indian to file brief in support of Plf's Reply brief in support of Plf's Cross Motion for Summ Judgment Against the Class Action Defts & the Federal Defts that exceeds page limitation (10 pages). (sh)

Sub #	Date	Description
648	2/22/94	REPLY by plaintiff Southern Ute Indian to Class Action Defts & Federal Defts' responses to Plf's motion for summary judgment before Judge Lewis T. Babcock [586-1]. (NOTE: This document has been FILED UNDER SEAL and HAS BEEN PLACED IN THE VAULT.) (FURTHER NOTE: Per stipulation & court's order granting it 7/11/94, this document has been UNSEALED and is now available in the file.) (sh) [Edit date 07/13/94]
649	2/22/94	Volume 7: EXHIBITS to Plf's motion reply [648-1] to Plf's motion for summary judgment before Judge Lewis T. Babcock [586-1]. (NOTE: This document has been FILED UNDER SEAL and has been PLACED IN THE VAULT.) (sh)
650	2/22/94	LETTER to court from counsel for plaintiff Southern Ute Indian—enclosing original and copy of their Moiton for Leave to file . . . . in excess of 10 pages, proposed order, Tribe's reply brief in support of Tribe's Cross Motion for Summ Judgment . . ., and Volume 7 of Exhibits & Certificates of Service. (sh)
651	2/23/94	ORDER by Judge Lewis T. Babcock granting Plf's motion to file brief in support of Plf's Reply brief in support of Plf's Cross Motion for Summ Judgment Against the Class Action Defts & the Federal Defts that exceeds page limitation (10 pages) [647-1]. (cc: all counsel); entry date: 2/23/94 (sh)
652	4/14/94	MOTION by plaintiff Southern Ute Indian for order to unseal Tribe's Opening Brief & Reply Brief & the Tribe's Exhibits re Tribe's Cross-Motion for Summ Judgment Against the Class Action Defts & Federal Defts. (sh) [Edit date 04/18/94]

Sub #	Date	Description
653	4/18/94	MINUTE ORDER: by Judge Lewis T. Babcock regarding all parties given to 4/29/94 to respond to [652-1] Plf's motion for order to unseal Tribe's Opening Brief & Reply Brief & the Tribe's Exhibits re Tribe's Cross-Motion for Summ Judgment Against the Class Action Defts & Federal Defts. (cc: all counsel); entry date: 4/18/94 (sh)
654	4/29/94	OBJECTIONS by Federal Defts to Plf's motion for order to unseal Tribe's Opening Brief & Reply Brief & the Tribe's Exhibits re Tribe's Cross-Motion for Summ Judgment Against the Class Action Defts & Federal Defts [652-1]. (sh)
655	5/3/94	Correction & Substitution to CERTIFICATE of Service of Federal Defts Objection to Tribe's Motion to Unseal Briefs & Exhibits, filed 4/29/94 indicating that copies were mailed to the persons listed on 5/2/94. (sh) [Entry date 05/04/94]
656	5/10/94	MINUTE ORDER: by Judge Lewis T. Babcock—in court hrg on all pending motions set for 10:00 a.m. on 6/17/94. (cc: all counsel); entry date: 5/11/94 (sh) [Entry date 05/11/94]
657	5/11/94	MOTION by plaintiff Southern Ute Indian for leave to file reply to Federal Defts' Objection to Tribe's Motion to Unseal Briefs & Exhibits. (sh) [Entry date 05/12/94]
658	5/12/94	ORDER by Judge Lewis T. Babcock granting Plf Tribe's motion for leave to file reply to Federal Defts' Objection to Tribe's Motion to Unseal Briefs & Exhibits [657-1] —rply to be filed by 5/20/94. (cc: all counsel); entry date: 5/13/94 (sh) [Entry date 05/13/94]

Sub #	Date	Description
659	5/19/94	NOTICE by plaintiff Southern Ute Indian of attorney Scott B. McElroy & Alice Walker's change of address. (sh)
660	5/19/94	REPLY by plaintiff Southern Ute Indian to Defts' response to Plf's motion for order to unseal Tribe's Opening Brief & Reply Brief & the Tribe's Exhibits re Tribe's Cross-Motion for Summ Judgment Against the Class Action Defts & Federal Defts [652-1]. (sh)
661	5/23/94	LETTER to court from counsel John V. Wachtel for defendant Natl Coop Refinery requesting that his name be removed from the mailing list—he states that he withdrew some time ago. (sh)
663	5/24/94	M[illegible]TE ORDER: by Magistrate Judge D[illegible] E. Abram APPROVING [662-1] notice of Pendency of Class Action & of Rights of Class Members. (cc: all counsel); entry date: 6/1/94 (sh) [Entry date 06/01/94]
662	5/31/94	Copy of NOTICE by plaintiff Southern Ute Indian of Pendency of Class Action & of Rights of Class Members. (sh) [Entry date 06/01/94]
664	5/31/94	SPECIAL ORDER OF REFERENCE by Judge Lewis T. Babcock to Magistrate Judge Donald E. Abram referring to Magistrate Judge Donald E. Abram for recommendation on the Plf's motion for order to unseal Tribe's Opening Brief & Reply Brief & the Tribe's Exhibits re Tribe's Cross-Motion for Summ Judgment Against the Class Action Defts & Federal Defts [652-1]. (cc: to counsel) (sh) [Entry date 06/01/94]

Sub #	Date	Description
665	5/31/94	MOTION by plaintiff Southern Ute Indian, defendant Meridian Oil, Inc. and Land Owners Coalseam Committee for Magistrate Judge Abram to review Meridian Settlement Agreement. (sh) [Entry date 06/01/94]
666	6/1/94	Unopposed MOTION by plaintiff Southern Ute Indian, defendant Tiffany Gas Company for Magistrate Judge's review of Tiffany Settlement Agreement. (sh) [Entry date 06/02/94]
667	6/2/94	ORDER by Judge Lewis T. Babcock granting Unopposed Joint motion for Magistrate Judge's review of Tiffany Settlement Agreement. [666-1]. (cc: all counsel); entry date: 6/3/94 (sh) [Entry date 06/03/94]
668	6/6/94	Notice of Error (ERRATA) & Correction by plaintiff Southern Ute Indian to P. 62 of Tribe's motion reply [648-1] (sh)
669	6/6/94	ORDER by Judge Lewis T. Babcock granting the errata notice [668-1], regarding [648-1] Plf's motion reply regarding [586-1] motion for summary judgment before Judge Lewis T. Babcock. (NOTE: The Notice of Error & Correction [668-1] and this Order have been FILED UNDER SEAL and have been PLACED IN THE VAULT.) (cc: all counsel); entry date: 6/6/94 (sh)
670	6/17/94	COURTROOM MINUTES by Judge Lewis T. Babcock taking under advisement on the motion to dismiss action as time barred; for lack of jurisdiction and alternatively for Mineral Owner defs on class action claim and class action defenses before Judge Lewis T. Babcock [627-1], taking

Sub #	Date	Description
		under advisement on the motion for summary judgment before Judge Lewis T. Babcock [586-1], taking under advisement on the motion to dismiss this action as time-barred by 28 U.S.C. Sec. 2401 before Judge Lewis T. Babcock [579-1], taking under advisement on the motion for summary judgment that, inter alia, Plf Tribe does not own the coalbed methane before Judge Lewis T. Babcock [579-2], taking under advisement on the motion for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1]; entry date: 6/20/94 (pa) [Entry date 06/20/94]
671	6/21/94	CERTIFICATE of mailing on 6/16/94 ntc of pendency class action and of rights of class members to names and addresses being provided by Mobil Oil Corp by plaintiff Southern Ute Indian (lm) [Entry date 06/22/94]
672	6/21/94	NOTICE of pendency of class action and of rights of class members by plaintiff Southern Ute Indian . . . ddl for objs to certification 7/7/94, to be in motion form as set forth in this notice . . . lead csl for dfts David E. Brody—(303) 830-5677 and pla, Thomas H. Shipps (303) 247-1755, Scott B. McElroy—(303) 442-2021 and Michael T. McConnell—(303) 832-1122 Tribe is represented by Thomas Shipps—(303) 247-1755, Scott McElroy—(303) 442-2021 and Michael McConnell—(303) 832-1122 (lm) [Entry date 06/22/94]
673	6/28/94	ORDER by Magistrate Judge Donald E. Abram regarding [652-1] motion for order to unseal Tribe's Opening Brief & Reply

Sub #	Date	Description
		Brief & the Tribe's Exhibits re Tribe's Cross-Motion for Summ Judgment Against the Class Action Defts & Federal Defts—Parties to submit a Motion to Withdraw this motion or a stipulated order. If motion is unresolved, counsel to inform Magistrate's secretary by 7/7/94. (cc: all counsel); entry date: 6/28/94 (sh)
674	6/28/94	ORDER by Magistrate Judge Donald E. Abram regarding [665-1] motion for Magistrate Judge Abram to review Meridian Settlement Agreement. The Agreement approved as to form, subject to approval by Judge Babcock. Recommended that the Meridian Settlement Agreement be approved by the Court. (cc: all counsel); entry date: 6/28/94 (sh)
675	6/28/94	ORDER of the Settlement Master by Magistrate Judge Donald E. Abram regarding [666-1] motion for Magistrate Judge's review of Tiffany Settlement Agreement. This agreement approved as to form & substance, subject to approval by Judge Babcock. Recommended that the Tiffany Settlement Agreement be approved, attached & adopted in the court's Order of Approval & Court order that Tiffany Gas Co. be dismissed with prejudice and direct entry of judgment. (cc: all counsel); entry date: 6/28/94 (sh)
676	6/28/94	ORDER by Judge Lewis T. Babcock regarding [675-1] order of Settlement Master, granting Plfs/Tiffany Gas' motion for Magistrate Judge's review of Tiffany Settlement Agreement [666-1]. Settlement agreement entered between Plf & Deft Tiffany Gas dated 7/30/93 is approved & incorporated as part of this Order. Dis-

Sub #	Date	Description
		missing party Tiffany gas Company with prejudice. Order of dismissal directed to be entered as a final judgment re claims brought by the Tribe against Tiffany Gas. (cc: all counsel) ; entry date: 6/29/94 (sh) [Entry date 06/29/94]
677	7/5/94	STIPULATION by parties, Agreement, & Motion Re Tribe's Motion to Unseal Briefs & Exhibits. (sh) [Entry date 07/07/94]
678	7/11/94	ORDER by Magistrate Judge Donald E. Abram APPROVING [677-1] stipulation, Agreement & Motion re Tribe's Motion to Unseal Briefs & Exhibits—made an order of this court. (cc: all counsel) ; entry date: 7/12/94 (sh) [Entry date 07/12/94]
679	7/12/94	STIPULATION by plaintiff Southern Ute Indian, defendant Meridian Oil, Inc. to dismiss case with prejudice before Judge Lewis T. Babcock, and for order to incorporate Settlement Agreement before Judge Lewis T. Babcock. [Entry date 07/13/94]
680	7/14/94	ORDER by Judge Lewis T. Babcock APPROVING [679-1] stipulated motion to dismiss case with prejudice before Judge Lewis T. Babcock; APPROVING [679-2] stipulated motion for order to incorporate Settlement Agreement before Judge Lewis T. Babcock. Dismissing party Meridian Oil, Inc. with prejudice from this action & Incorporating Settlement Agreement. Until U.S. Dept of Interior issues accommodation approval of the Meridian Settlement Agreement & it is furnished to the court, this order not to be considered a final judgment. Upon issuance of that approval, parties to furnish copy of it to the court. (cc: all counsel) ; entry date: 7/15/94 (sh) [Entry date 07/15/94]

Sub #	Date	Description
681	7/26/94	EXHIBITi—Revised Volume 7 (which is open to the public)—submitted per stipulation [677-1] and Court's order [678-1] of 7/11/94—Re original Volume 7 (which remains under seal) [649-1] to Plfs' motion reply [648-1] to Plfs' motion for summary judgment before Judge Lewis T. Babcock [586-1]. (sh)
682	7/26/94	LETTER to court from plaintiff Southern Ute Indian enclosing the Revised Volume 7 exhibit which will now be open to the public. The original Volume 7 exhibit remains under seal. (sh)
683	9/13/94	MEMORANDUM, OPINION, AND ORDER: by Judge Lewis T. Babcock granting in part & denying in part Deft Amoco's motion for summary judgment on the class action claim and the class action defenses before Judge Lewis T. Babcock [554-1]—granted re question of ownership of CBM gas & judgment to enter in favor of the deft class against Plf Tribe upon its claim for declaration of ownership of CBM gas in the lands at issue. Amoco's motion is denied as moot on the class action defenses based on conclusion that Tribe does not own the CBM gas. Denying the Tribe's motion for summary judgment before Judge Lewis T. Babcock [586-1]. Denying federal defts motion to dismiss this action as time-barred by 28 U.S.C. Sec. 2401 before Judge Lewis T. Babcock [579-1]; granting federal defts' motion for summary judgment that, inter alia, Plf Tribe does not own the coalbed methane [579-2], but only on issue of breach of fiduciary duty for failure to manage the CBM gas. Further scheduling/status conf set for

Sub #	Date	Description
		3:00 p.m. on 11/4/94. At that time Court will consider FRCP 54(b) certification. Ten days prior to the conf parties to submit agreed proposed form of Rule 54(b) order & proposed form of judgment to be certified. Any areas of disagreement in the proposed forms to be specified along with reasons therefor, & supplemented by suggested alternative language. (cc: all counsel); entry date: 9/14/94 (sh) [Entry date 09/14/94]
684	10/6/94	MOTION by defendant McKenzie Methane to withdraw attorney Roger Lichty as atty of record. (sh)
685	10/11/94	ORDER by Judge Lewis T. Babcock granting motion to withdraw attorney Roger Lichty as atty of record for dft McKenzie Methane Corp [684-1] (cc: all counsel); entry date: 10/12/94 (lm) [Entry date 10/12/94]
686	10/21/94	(NOTICE OF SETTLEMENT) Joint Filing by plaintiff Southern Ute Indian, defendant Meridian Oil, Inc. of Fully Executed Settlement Agreement, Together With Accommodation Approval of the U.S. Dept of Interior. (sh) [Entry date 10/25/94]
687	10/24/94	ORDER Directing Entry of Final Judgment as to Deft Meridian Oil Inc. by Judge Lewis T. Babcock APPROVING [686-1] the joint settlement notice and pursuant to [680-2] order of dismissal filed 7/14/94. (cc: all counsel); entry date: 10/27/94 (sh) [Entry date 10/27/94]

Sub #	Date	Description
668	10/25/94	Judgment: by Clerk James R. Manspeaker regarding [687-1] order Directing Entry of Final Judgment; dismissing party Meridian Oil, Inc. with prejudice. (cc: all counsel); entry date: 10/27/94 (sh) [Entry date 10/27/94]
689	10/25/94	MOTION by plaintiff Southern Ute Indian for Entry of Case Management Order No. 3. (NOTE: The original proposed Order attached to this motion has been forwarded to Judge Babcock's chambers for his signature. (sh) [Entry date 10/27/94]
690	10/25/94	Memo BRIEF FILED by plaintiff Southern Ute Indian re entry of judgment and Certification under 28 USC Sec. 1292(b) re Court's Memo Opinion & Order [683-1] and in support of Plf's motion for Entry of Case Management Order No. 3 [689-1]. (sh) [Entry date 10/27/94]
691	10/25/94	STATEMENT by defendant Amoco Production Co—Proposed Judgment & Order of Certification & Brief in Support per directions set forth in Memo Opinion & Order [683-2] of 9/13/94. (NOTE: The proposed Judgment (Exhibit 1) and Order (Exhibit 2) have been submitted to Judge Babcock's chambers for his signature.) (sh) [Entry date 10/27/94]
692	10/25/94	OBJECTIONS by defendant Amoco Production Co to Plf's motion for Entry of Case Management Order No. 3 [689-1]. (sh) [Entry date 10/27/94]
693	10/31/94	NOTICE by defendant Amoco Production Co of Filing of Amended Form of Judgment. (NOTE: The proposed Judgment was submitted to Judge Babcock's cham-

Sub #	Date	Description
		bers for his/the clerk's signature.) (sh) [Entry date 11/01/94]
694	11/1/94	RESPONSE submitted by Land Owners Coalseam Committee to Plf's motion for Entry of Case Management Order No. 3 [689-1]. (sh) [Entry date 11/02/94]
696	11/4/94	COURTROOM MINUTES by Judge Lewis T. Babcock regarding the issue of form of judgment to be certified to the Tenth Circuit Court of Appeals of the [683-2] order entered 9/13/94. Counsel to submit proposed forms of judgment & case management orders next week. Status quo to be maintained re issue of severance tax. Status conf held 11/4/94. entry date: 11/8/94 (sh) [Entry date 11/08/94]
695	11/7/94	TRANSCRIPT of proceedings of Hrg on Summ Judgment Motion held before Judge Babcock on 6/17/94 (169 pages). (sh) [Entry date 11/08/94]
697	11/18/94	NOTICE by defendant McKenzie Methane of filing bankruptcy CASE STAYED stay motion [697-1]. (sh) [Entry date 11/21/94]
698	11/18/94	SUPPLEMENTAL Memo by plaintiff Southern Ute Indian re Proposed Form of Judgment, Proposed Form of Certification, & Case Management in addition to Plfs' brief [690-1] and motion for Entry of Case Management Order No. 3 [689-1]. (NOTE: Exhibits 1-4 to this document have been forwarded to Judge Babcock for his review & signature.) (sh) [Entry date 11/21/94]
699	11/18/94	STATEMENT by defendant Amoco Production Co—Revised Proposed Judgment

Sub #	Date	Description
		& Order of Certification re statement [691-1]. (NOTE: the exhibits attached to this document were submitted to Judge Babcock's chambers for his review & signature.) (sh) [Entry date 11/21/94]
700	11/29/94	ORDER of Certification Pursuant to Rule 54(b) and 28 USC Sec. 1292(b) by Judge Lewis T. Babcock regarding [683-2] Memo Opinion & Order. Findings set forth in this order. Judgment to enter as attached. (cc: all counsel); entry date: 11/30/94 (sh) [Entry date 11/30/94]
701	11/29/94	JUDGMENT: by Chief Deputy Clerk Stephen P. Ehrlich regarding [683-2] Memo Opinion & Order and [700-1] Order of Certificaton. . . Judgment entered for Defts named in First Amended Comp & Deft Class & against Plf on the Class Action claim. Judgment entered on the 1st-5th, 7th, 8th & 10th claims for relief in their entirety. Partial judgment entered for named defts & deft class & against Plf on the 6th claim to the extent that claim is based on a claim that the Tribe owns the coalbed methane. Partial judgment entered for Federal Defts & against Plf on the 11th claim for relief to the extent that claim is based on a claim that the Fed. Defts have breached their fiduciary duty to the Tribe by permitting/acquiescing in the extraction of coalbed methane from the lands within exterior boundaries of the Southern Ute Indian Reservation, where the Tribe owns the coal but not the coalbed methane. (cc: all counsel); entry date: 11/30/94 (sh) [Entry date 11/30/94]

Sub #	Date	Description
702	11/29/94	Case Management ORDER No. 3 (Modified)—by Judge Lewis T. Babcock granting in part Plf's motion for Entry of Case Management Order No. 3 [689-1]. Order includes sub-headings "Notice," "Abeyance of Claims & Defenses," "Tribal Severance Tax," and "Other Orders." (cc: all counsel); entry date: 11/30/94 (sh) [Entry date 11/30/94]
703	12/6/94	TRANSCRIPT of proceedings of Status Hrg held before Judge Babcock on 11/4/94 (48 pages). (sh)
704	12/9/94	NOTICE OF APPEAL by plaintiff Southern Ute Indian re: judgment [701-1] of 11/29/94; Notice of transcript order form due 12/19/94; Notice mailed to all counsel on 12/12/94 (gc) [Entry date 12/12/94]
—	12/9/94	$100.00 fee and $5.00 fee paid. Receipt No. 168661. re: appeal [704-1] (gc) [Entry date 12/12/94]
705	12/9/94	MOTION by plaintiff Southern Ute Indian to amend (alter) judgment Pursuant to FRCP 59(e) [701-1]. (sh) [Entry date 12/14/94]
706	12/12/94	MINUTE ORDER: by Judge Lewis T. Babcock regarding Defts given to 12/28/94 to respond to [705-1] Plf's motion to amend (alter) judgment Pursuant to FRCP 59(e) [701-1]. (cc: all counsel); entry date: 12/14/94 (sh) [Entry date 12/14/94]
707	12/15/94	LETTER to court from counsel William P. Godsman for defendant Hondo Oil & Gas Co, defendant Palo Petroleum, Inc. requesting that his name be removed from the mailing list for these defts have been dismissed. (sh) [Entry date 12/19/94]

Sub #	Date	Description
708	12/20/94	LETTER to court from Jane E. Jacobs, Sec. to G. Donohue Kane, counsel for defendant Tiffany Gas Company requesting that William R. Baesman be removed from com and replaced with Mr. Donohue. (gc)
709	12/23/94	Case No. 94-1579 assigned by the Court of Appeals. [704-1] (gc) [Entry date 12/28/94]
710	12/28/94	NOTICE OF TRANSCRIPT ORDER FORM filed by plaintiff/appellant Southern Ute Indian; (Necessary transcript already on file) re: appeal [704-1] (gc) [Entry date 12/29/94]
712	12/28/94	RESPONSE by defendant Amoco Production Co to motion to amend (alter) judgment Pursuant to FRCP 59(e) [701-1]. [705-1] (gc) [Entry date 12/30/94]
711	12/29/94	LETTER (Re: [704-1) to USCA and all counsel advising that record is now complete . . . tof filed stating necessary transcript is already on file. (gc)
713	12/29/94	NOTICE by defendant Bowen/Edwards Assoc of attorney change of address for Dante L. Zarlengo (gc) [Entry date 12/30/94]
714	1/5/95	MOTION (Request) by plaintiff Southern Ute Indian for leave to file reply in support of mtn to amd jgm (lm) [Entry date 01/06/95]
715	1/5/95	REPLY by plaintiff Southern Ute Indian to response to pla's motion to amend judgment [701-1], [705-1] (lm) [Entry date 01/06/95]
716	1/5/95	MINUTE ORDER: by Judge Lewis T. Babcock granting the Tribe's req for leave

Sub #	Date	Description
		to file reply in support of mtn to amd jgm [714-1] (cc: all counsel); entry date: 1/6/95 (lm) [Entry date 01/06/95]
717	1/6/95	Copy of ORDER from Court of Appeals [704-1] dated 1/4/95. NOA was filed before disposition by dist ct of Motion of Pltf to amend judgment pursuant to FRCP 59(e). NOA is ineffective until date of entry of order disposing of motion. Appeal is ABATED pending notification that dist ct has disposed of pltf's motion. When order enters, pltf' to notify ct and clerk of dist ct to supplement prel record. (gc) [Entry date 01/09/95]
718	1/17/95	ORDER by Judge Lewis T. Babcock denying Tribe's motion to amend judgment [701-], [705-1] (cc: all counsel); entry date: 1/18/95 (lm) [Entry date 01/18/95]
719	1/23/95	AMENDED NOTICE OF APPEAL by plaintiff Southern Ute Indian re: appeal [704-1] in re: judgment [701-1] of 11/29/94 and order [718-1] of 1/17/95. Notice mailed to all counsel on 1/24/95. (gc) [Entry date 01/24/95]
720	1/30/95	LETTER (Re: [704-1]) from USCA to counsel advising that they have rec'd ntc that jgm was entered on 1/17/94 (sic). Notice of appeal has been treated as filed after such entry. (gc)
721	2/2/95	AMENDED MEMORANDUM, OPINION, AND ORDER: Nunc Pro Tunc to 9/13/94 by Judge Lewis T. Babcock re [683-?], [701-1]; . . . . III. B. 2. 1981 Solicitor Opinion. . . . 1. Amoco's mtn for sum jgm is granted on the question of ownership of CBM gas and judgment shall enter in favor

Sub #	Date	Description
		of the dft class against the pla Tribe upon its claim for declaration of ownership of CBM gas in the lands at issue; 2. Amoco's mtn for sum jgm on the class action defenses is denied as moot based on the conclusion that the Tribe does not own the CBM gas; 3. the Tribe's mtn for sum jgm is denied; 4. federal dfts' mtn for sum jgm is granted but only on the issue of breach of fiduciary duty for failure to manage the CBM gas; a further scheduling and status hearing will be held on 11/4/94 at 3:00 pm at which time I will consider FRCP 54(b) certification (cc: all counsel); entry date: 2/3/95 (lm) [Entry date 02/03/95] [Edit date 02/03/95]
722	3/16/95	NOTICE by dfts CO Natl Bk Denver, CO Natl Bk Longmont of attorney change of address (lm)
723	1/23/96	ATTORNEY APPEARANCE for defendant Anthony F. Zarlengo by Dante L. Zarlengo (yk) [Entry date 01/24/96]
724	1/23/96	MOTION by defendant Anthony F. Zarlengo for substitute party Vincent Zarlengo and Richard Zarlengo as co-personal reps of estate of Anthony F. Zarlengo, dcd (yk) [Entry date 01/24/96]
725	1/23/96	Motion by Vincent A. Zarlengo, Richard A. Zarlengo, as co personal representatives of estate of Antyhony Zarlengo to dismiss before Judge Lewis T. Babcock (yk) [Entry date 01/24/96]
726	8/19/96	ORDER by Judge Lewis T. Babcock granting motion for substitute party Vincent Zarlengo and Richard Zarlengo as co-personal reps of estate of Anthony F. Zar-

Sub #	Date	Description
		lengo, dcd [724-1], granting motion to dismiss before Judge Lewis T. Babcock [725-1] terminating party Anthony F. Zarlengo, substituting defendant Vincent A. Zarlengo, Richard A. Zarlengo, dismissing party Richard A. Zarlengo, party Vincent A. Zarlengo. Amoco Production Co. is substituted for Anthony F. Zarlengo as to pltf's claims 1-5, 7, 8 and 10 and as to claims 6 and 9 to the extent that those claims pertain to production of coal bed methane from certain wells. Each party to bear its own costs, expenses and atty fees. (cc: all counsel); entry date: 8/19/96 (gc)
—	8/28/96	MAIL Returned order [726-4] [726-4] addressed to defendant-Richmond Petroleum (dc) [Entry date 09/04/96]
727	8/30/96	NOTICE by defendant JM Huber Corporation of attorney change of address (dc) [Entry date 09/03/96]
728	10/29/96	ATTORNEY APPEARANCE for defendant Emerald San Juan Co by Marc D. Flink (jj) [Entry date 10/30/96]
729	10/29/96	MOTION by plaintiff Southern Ute Indian and Emerrald for magistrate judge to review Emerald settlement agreement (jj) [Entry date 10/30/96]
730	10/30/96	MOTION by defendant Emerald San Juan Co, plaintiff Southern Ute Indian to dismiss Emerald from this case w/prejudice, and for order to incorporate settlement agreement (jj)
731	11/1/96	ORDER OF STLMNT MASTER (MAGIS REC) that stlmnt agreement between So Ute Ind Tribe and Emerald San Juan Co

Sub #	Date	Description
		be approved by Magistrate Judge Donald E. Abram concerning motion to dismiss Emerald from this case w/prejudice [730-1], motion for order to incorporate settlement agreement [730-2] (cc: all counsel); entry date: 11/4/96 (dc) [Entry date 11/04/96]
732	11/1/96	ORDER by Judge Lewis T. Babcock adopting [731-1] - Magistrate's Recommendation granting motion to dismiss unnamed dft Emerald from this case w/prejudice [730-1], granting motion for order to incorporate settlement agreement [730-2]; final jgmnt be entered as to Emerald San Juan Company, L.P., consistent with the terms of this Order; e/pty bear own costs/fees (cc: all counsel); entry date: 11/4/96 (dc) [Entry date 11/04/96]
733	11/7/96	NOTICE by defendant Phillips Petroleum of attorney change of address (jj) [Entry date 11/08/96]
—	12/2/96	MAIL Returned order [732-1] (732-1] addressed to Frederick Douglas, Esq. (dc) [Entry date 12/09/96]
734	12/16/97	NOTICE by defendant Bowen/Edwards Assoc of attorney change of address (dc)
735	1/6/98	ATTORNEY SUBSTITUTION: terminating Michael Remine III (never listed as counsel) and substituting attorney Kevin Kuhn (already appearing) (dc)
764	2/2/98	Certied copy of TRANSCRIPT of proceedings of Settlment with Magis Judge D.E. Abram at 2:38 pm Jan 21 '99 (1-29 pages) Prepared By: AveryWoodsReportingServiceInc. (dc) [Entry date 02/03/99]

Sub #	Date	Description
736	8/7/98	MINUTE ORDER: by Magistrate Judge Donald E. Abram; settlement/status conf set for 11:00 8/20/98 counsel only (cc: all counsel); entry date: 8/10/98 (dc) [Entry date 08/10/98]
737	8/20/98	COURTROOM MINUTES by Magistrate Judge Donald E. Abram; status of case discussed; settlement conf turned into status conference was held 8/20/98; settlement conf set for 10:30 11/19/98; entry date: 8/21/98 Court Reporter: DEA Tapes 98-80,81 (dc) [Entry date 08/21/98]
738	8/21/98	MEMORANDUM by Magistrate Judge Donald E. Abram advising that a combined status/settlement conf held 8/20/98; another settlement conf set for 10:30 11/19/98 (dc)
739	9/3/98	Joint MOTION by plaintiff Southern Ute Indian, defendant Amoco Production Co and LOCC for protective order approving confidentiality agreement (dc) [Entry date 09/04/98]
740	9/8/98	PROTECTIVE ORDER signed 9/8/98 by Magistrate Judge Donald E. Abram: granting stipulated motion for protective order approving confidentiality agreement [739-1]; settlement/status conf set for 10:30 11/19/98 (cc: all counsel) (dc) [Entry date 09/09/98]
741	9/11/98	MANDATE from the Court of Appeals; CA # 94-1579; Dt issued 9/11/98; JUDGMENT dated 7/20/98 reversing jgm of the district court and remanding for further proceedings Statement of Costs. . . . $7,006 taxed in favor of appellant Southern Ute Indian Tribe. [Appeal [704-1] (gc) [Entry date 09/14/98]

Sub #	Date	Description
742	9/24/98	Motion REQUEST by defendant Conoco, Inc. for removal from certificate of service (gc) [Entry date 09/25/98]
743	9/25/98	ORDER by Judge Lewis T. Babcock granting motion of deft Conoco for removal from certificate of service [742-1]. Russel D. Howell and Robert C. Hawley to be removed. (cc: all counsel); entry date: 9/28/98 (dc) [Entry date 10/01/98]
744	9/30/98	MINUTE ORDER : by Magistrate Judge Donald E. Abram at request of counsel to set ; settlement conf is set for 2:00 10/8/98 (cc: all counsel) ; entry date : 10/1/98 (dc) [Entry date 10/01/98]
745	10/8/98	MEMORANDUM by Magistrate Judge Donald E. Abram; settlement conf held 10/09/98]
746	10/16/98	NOTICE by defendant Fuel Resources Dev. defendant Natl Coop Refinery of attorney Charles Carpenter change of address (yk) [Entry date 10/19/98]
747	10/16/98	ATTORNEY APPEARANCE by Charles Carpenter for Petrogulf Corp (yk) [Entry date 10/19/98]
748	11/24/98	MEMORANDUM by Magistrate Judge Donald E. Abram; settlement conf set for 10:00 12/18/98 (yk) [Entry date 11/25/98]
749	11/25/98	NOTIFICATION from Court of Appeals regarding Petition for Writ of Certiorari Filed in US Supreme Court on 11/18/98 Case No. 98-830 (re appeal [704-1] (gc) [Entry date 11/27/98]
750	12/14/98	AMENDMENT TO (SUPPLEMENT) protective order [740-2] as set forth, approv-

Sub #	Date	Description
		ing the attached settlement process agreement (dc) [Entry date 12/15/98]
751	12/17/98	MOTION by defendant Amax Oil & Gas, Inc. for substitute party Universal Resources Corporation (dc) [Entry date 12/18/98]
752	12/17/98	MOTION by defendant Amax Oil & Gas, Inc. to substitute attorney John F Shpeherd and Charles P Henderson of Holland & Hart for Amax (nka Union Pacific Oil & Gas Co) (dc) [Entry date 12/18/98]
753	12/18/98	MINUTE ORDER: by Judge Lewis T. Babcock granting motion to substitute attorney John F Shpeherd and Charles P Henderson of Holland & Hart for Amax (nka Union Pacific Oil & Gas Co) [752-1] attorney Lynn P. Hendrix for Amax Oil & Gas, Inc., attorney Maria J. Williams for Amax Oil & Gas, Inc. and substituting attorney John Frederic Shepherd, Charles Park Henderson (cc: all counsel); entry date: 12/21/98 (dc) [Entry date 12/21/98]
754	12/18/98	ORDER by Judge Lewis T. Babcock granting motion for susbtitute party Universal Resources Corporation [751-1] substituting defendant Universal Resources (cc: all counsel); entry date: 12/21/98 (dc) [Entry date 12/21/98]
755	12/29/98	MINUTE ORDER: by Magistrate Judge Donald E. Abram; settlement conf set for 1:00 1/7/99 between Amoco and So Ute Tribe (cc: all counsel); entry date: 12/29/98 (dc)
756	1/7/99	MEMORANDUM by Magistrate Judge Donald E. Abram; settlement conf held 1/7/99 no settlement (dc)

Sub #	Date	Description
757	1/19/99	SEALED COURTROOM MINUTES by Magistrate Judge Donald E. Abram; ; entry date: 1/19/99 Court Reporter: DEA Civil Tape 99-7 (dc)
758	1/19/99	MINUTE ORDER: by Magistrate Judge Donald E. Abram; settlement conf set for 10:30 1/21/99 (cc: all counsel); entry date: 1/21/99 (dc) [Entry date 01/21/99]
759	1/21/99	SEALED COURTROOM MINUTES by Magistrate Judge Donald E. Abram; settlement conf held 1/21/99; entry date: 1/25/99 Court Reporter: DEA Tape 99-11 - with attachments ** placed in brown envelope and filed in Exh Room in SEALED AREA (dc) [Entry date 01/25/99]
760	1/22/99	SEALED COURTROOM MINUTES by Magistrate Judge Donald E. Abram continuing settlement conference [759-1]; [759-2] minutes; entry date: 1/25/99 Court Reporter; DEA Tape 99-10 ** in brown envelope with doc 759 in Exh Room in SEALED AREA (dc) [Entry date 01/25/99]
761	1/22/99	MEMORANDUM from Magistrate Judge Donald E. Abram advising of partial settlement (dc) [Entry date 01/26/99]
762	2/2/99	Certified copy of TRANSCRIPT of proceedings at 11:50 am of Settlment with Magis Judge D.E. Abram Jan 19'99 (1-12 pages) Prepared By: AveryWoodsReportingServiceInc. (dc) [Entry date 02/03/99]
763	2/2/99	Certified copy of TRANSCRIPT of new afternoon session of proceedings of Settlment with Magis Judge D.E. Abram Jan 21'99 (1-7 pages) Prepared By: Avery

Sub #	Date	Description
		WoodsReportingServiceInc (dc) [Entry date 02/03/99]
765	2/2/99	Certified copy of TRANSCRIPT of proceedings of Settlment with Magis Judge D.E. Abram at 9:30 am Jan 22 '99 (1-6 pages) Prepared By: AveryWoodsReportingServiceInc (dc) [Entry date 02/03/99]

UNITED STATES COURT OF APPEALS
FOR THE TENTH CIRCUIT

Case 94-01579

SOUTHERN UTE INDIAN TRIBE,
Plaintiff-Appellant,
v.
AMOCO PRODUCTION CO., *et al.*,
Defendants-Appellees.

DOCKET ENTRIES

Date	Description
12/22/94	[819357] Civil case docketed. Preliminary record filed. Transcript order form due 1/3/95 for Gwen Daniel pursuant to R.42.1 Docketing statement due 1/3/95 for Southern Ute Indian Notice of appearance due 1/3/95 for Albert E. Zarlengo, for Southern Ute Indian, for Amoco Production, for Hondo Oil & Gas, for Colorado Nat'l Bank, for Colorado Nat'l, for North Central Oil, for Phillips Petroleum, for Amax Oil & Gas, Inc., for Bowen/Edwards Assoc., for Conoco, Inc., for Fuel Resources, for J.M. Huber Corp., for Markwest Energy, for McKenzie Methane, for Meridian Oil, Inc., for Mobil Oil, for National Cooperative, for Northwest Pipeline, for Pablo Operating, for Palo Petroleum,, Inc., for Palo/Eagle Joint, for Richmond Petroleum, for Tiffany Gas Company, for Wililams Production, for Union Texas, for Manuel Lujan, for DOI, for Bureau of Indian, for Bureau of Land, for Minerals Management for Eddie F. Brown, for Delos Cy Jamison (mbm)

Date	Description
12/22/94	[820230] Docketing statement filed by Southern Ute Indian Original and 4 copies c/s: y. (mbm)
12/22/94	[820231] Notice filed that the transcript is already on file in district court. Notice due that record is complete 1/3/95 for Lewis T. Babcock (mbm)
12/22/94	[821085] Notice of appearance filed by Edward J. Shawaker as attorney for Delos Cy Jamison, Eddie F. Brown, Minerals Management, Bureau of Land, Bureau of Indian, DOI, Manuel Lujan. CERT. OF INTERESTED PARTIES (y/n): y Attorneys Martin W. Matzen and Anne S. Almy terminated for Manuel Lujan, DOI, Bureau of Indian, Bureau of Land, Minerals Management, Eddie F. Brown, and Delos Cy Jamison. (afw)
12/22/94	[821087] Notice of appearance filed by James P. Rouse as attorney for Richmond Petroleum. CERT. OF INTERESTED PARTIES (y/n): y (afw)
12/28/94	[821799] Notice of appearance filed by Dante L. Zarlengo as attorney for Bowen/Edwards Assoc.. CERT. OF INTERESTED PARTIES (y/n): y. (pdw)
12/29/94	[820972] Filed notice record is complete 12/29/94. Appellant/Petitioner's brief due 2/7/95 for Southern Ute Indian Appellant/Petitioner's appendix due 2/7/95 for Southern Ute Indian (pdw)
12/30/94	[821165] Notice of appearance filed by Peter A. Bjork, Laura L. Lindley, Gregory R. Danielson as attorney for Mobil Oil, North Central Oil. CERT. OF INTERESTED PARTIES (y/n): y (mbm)
1/3/95	[821432] Notice of appearance filed by Frank Edward Maynes, Thomas H. Shipps as attorney for Southern Ute Indian. CERT. OF INTERESTED PARTIES (y/n): y (fg)
1/3/95	[821592] Notce of appearance filed by Thomas S. Nichols, Anthony J. Shaheen, Charles L. Kaiser as attorney for Amoco Production. CERT. OF

Date	Description
	INTERESTED PARTIES (y/n): n. Attorney Neil Peck for Amoco Production terminated. (mbm)
1/3/95	[821602] Notice of appearance filed by Maria J. Williams, Lynn P. Hendrix as attorney for Amax Oil & Gas, Inc., CERT. OF INTERESTED PARTIES (y/n): y (fg)
1/3/95	[821975] Notce of appearance filed by Daniel F. Warden as attorney for Williams Production, Northwest Pipeline. CERT. OF INTERESTED PARTIES (y/n): y (mbm)
1/4/95	[821775] Order filed by Judge(s) PF abating case [94-1579] Parties served by mail. (mbm)
1/4/95	[821981] Notice of appearance filed by Michael T. McConnell as attorney for Southern Ute Indian. CERT. OF INTERESTED PARTIES (y/n): y (mbm)
1/4/95	[823145] Notice of appearance filed by G. R. Miller as attorney for LOCC. CERT. OF INTERESTED PARTIES (y/n): y (fg)
1/5/95	[822398] Notice of appearance filed by Alice E. Walker, Scott B. McElroy as attorney for Southern Ute Indian. CERT. OF INTERESTED PARTIES (y/n): y (mbm)
1/6/95	[823317] Notice of appearance filed by Lon W. Abadie as attorney for J.M. Huber Corp., CERT. OF INTERESTED PARTIES (y/n): y. Attorney Thomas P. Dugan termnated for J.M. Huber Corp. (pdw)
1/17/95	[825106] Notice of appearance filed by John A. Bryson, Jacques B. Gelin as attorney for DOI. CERT. OF INTERESTED PARTIES (y/n): n (fg)

Date	Description
1/24/95	[827049] Amended notice of appeal filed. (fg)
1/24/95	[827927] Preliminary record on appeal filed. (fg)
1/27/95	[827905] Order filed by Judge(s) PF reactivating case [94-1579] Parties served by mail. (fg)
1/27/95	[829316] Order filed by Judge(s) PF - Appellant's brief due 3/8/95 for Southern Ute Indian Parties served by mail. (fg)
2/4/95	[830370] Order filed by PF notice of appearance form due 2/14/95 for Albert E. Zarlengo, Hondo Oil & Gas, Colorado Nat'l Bank, Colorado Nat'l, Phillips Petroleum, Conoco, Inc., Fuel Resources, J.M. Huber Corp., Markwest Energy, Meridian Oil, Inc., National Cooperative, Northwest Pipeline, Palo Petroleum, Inc., Tiffany Gas Company, Bureau of Indian, Bureau of Land, Minerals Management, Eddie F. Brown, and Delos Cy Jamison. Parties served by mail. (afw)
2/9/95	[831986] Notice of appearance filed by John L. Lawrence, Stan L. Spangler as attorney for Colorado Nat'l, Colorado Nat'l Bank. CERT. OF INTERESTED PARTIES (y/n) : y (fg)
2/13/95	[832914] Notice of appearance filed by Charles Carpenter as attorney for National Cooperative, Fuel Resources. CERT. OF INTERESTED PARTIES (y/n) : y (mbm)
2/13/95	[834033] Notice of appearance filed by Charles Carpenter as attorney for National Cooperative, Fuel Resources. CERT. OF INTERESTED PARTIES (y/m) : y (afw)
2/15/95	[833504] Notice of appearance filed by R. Dennis Ickes, Marilyn P. Fineshriber as attorney for Mobil Oil. CERT. OF INTERESTED PARTIES (y/n) : n. Attorney Larry L. Whyte terminated for Mobil Oil. (pdw)

Date	Description
2/17/95	[834944] Appellant's motion filed by Appellant Southern Ute Indian to extend time to file appellant's brief until 3/27/95 [94-1579]. Original and 3 copies c/s: y (fg)
2/23/95	[834945] Order filed by PF granting Appellant/ Petitioner motion to extend time to file apet brief [834944-1] A/Pet brief due 3/27/95 for Southern Ute Indian Parties served by mail. (fg)
2/28/95	[836513] Order filed by PF notce of appearance form due 3/10/95 for Phillips Petroleum, Conoco, Inc., Markwest Energy Meridian Oil, Inc., Northwest Pipeline, and Palo Petroleum, Inc. Parties served by mail (afw)
3/8/95	[839544] Notice of appearance filed by Teresa Silcox as attorney for Northwest Pipeline. CERT. OF INTERESTED PARTIES (y/n) : y Attorney Patricia E. Schmid terminated for Northwest Pipeline (afw)
3/17/95	[841142] Notice of appearance filed by Willam H. ReMine, David C. Little as attorney for Phillips Petroleum. CERT. OF INTERESTED PARTIES (y/n) : y (fg)
3/17/95	[841866] "Notice of Change of Address" filed by Shaw, Spangler & Roth. c/s: y. (pdw)
3/28/95	[843705] Appellant's brief filed by Southern Ute Indian Original and 7 copies. c/s: y. Served on 3/27/95 Oral argument? y. Appendix filed (11 volumes: Volume #11 is SEALED). Original and 1 appendix copy. Appellee/Respondent's brief due 5/1/95 for LOCC, for Mosbacher U.S.A., for SG Interests I, LTD, for J. Magness, Inc., for Bell South Corp., for Albert E. Zarlengo, for Wells Fargo Bank, for Roderick L. Turner, for First Interstate, for PM Associates, for Jane P. Mosbacher, for Lisa Jean Kaindl], for Larry James Kaindl, for James Eric Kaindl, for Thomas L.

Date	Description
	Johnstone, for Helen Crosland Hendricks, for Liberty Tulsa, for J. L. Goggans, for Mary Jane Enochson, for Henry L. Enochson, for Jack W. Crosland, for Addie G. Crosby, for NCNB TX Nat'l Bank, for Susie M. Ciancio, for Donald C. Ciancio, for Mary Jean Balle, for Jack Balle, for Scott S. Sewell, for Catherine Frances McElvain Harvey, for Amoco Production, for Shirley K. Adams, for Henry Ashworth, for Carla M. Aspaas, for Eric K. Aspass, for Helen Ruth Aspaas, for Laura Belle Aspaas, for Leta M. Adkins, for Rita M. Adkins, for Maxwell C. Anderson, for Earl A. Barker, for Tillie Flaks, for Cassio Frazzini, for Adele Frost, for Robert Galbasin, for Abel S. Gallegos, for H.A. Harmon, for Mabel McElvain, for Thornton H. McElvain, for Dorothy N. McKelvey, for Edwin L. McKelvey, for R. Franklin McKelvey, for W.R. McMahon, for McMurry Oil Company, for W. Clay Meredith, for W.A. Moncrief, for Roy E. Montgomery, for Forrest D. Miller, for Helen L. Miller, for Thomas S. Morrissey, for Fidel Lucero, for Richard C. Malcomb, for Suzanne Heath Manges, for Catherine B. McElvain, for Maurice C. Breen, for Horace F. Buchanan, for Hondo Oil & Gas, for Hyde Oil and Gas, for Charles Kettering, for A.B. Crosby, for Barbara Crosby, for David Crosby, for Colorado Nat'l Bank, for Colorado Nat'l, for Dorothy A. Corgin, for Kelly Cox, for George A. Bugg, for Carbone Investment, for Frederick E. Dickerson, for J.M. Eakes, for John Crow, for Montey Garnand, for Ruby Gibbs Goggins, for Margaret Crow, for Jack Carmack, for Rowland Carmack, for Christine Hamilton, for Hardin Simmons Univ., for Sally M. Etterbeck, for Minnie Flaks, for Robert McFerran Eakes, for Margaret Ellison, for Joseph C. Ciancio, for William Kemp Clark, for Manuel Cruz, for Louis M. Cummins, for Thomas J. Morrissey, for Emil Mosbacher, for John David

Date	Description
	Mosbacher, for R. Bruce Mosbacher, for Myra Theresa Moulds, for North Central Oil, for H.L. Oliver, for Clara Onofrio, for Margaret C. Pargin, for Harold F. Payne, for Neville G. Penrose, for Ben M. Peterson, for Frederick Petrocco, for Phillips Petroleum, for James M. Raymond, for W.E. Rennie, for Thomas C. Romolo, for Benton E. Smullyen, for Clinton I. Smullyen, for William Stirling, for J.L. Tatum, for Anna Carleo Tomeo, for Ernest Tomeo, for Turner Securities, for Richard W. Turner, for George C. Vance, for Anthony H. Veto, for Joseph F. Ware, for Albert E. Zarlengo, for Anthony F. Zarlengo, for Amax Oil & Gas, Inc., for Bowen/Edwards Assoc., for Fuel Resources, J.M. Huber Corp., for McKenzie Methane, for Mobil Oil, for National Cooperative, for Northwest Pipeline, for Palo/Eagle Joint, for Richmond Petroleum, for Williams Production, for Manuel Lujan, for DOI, for Bureau of Indian, for Bureau of Land, for Minerals Management, for Eddie F. Brown, for Delos Cy Jamison (pdw)
4/10/95	[847012] Appellee's motion to extend time to file appellee's brief until 5/19/95 filed by Delos Cy Jamison, Eddie F. Brown, Minerals Management, Bureau of Land, Bureau of Indian, DOI, Manuel Lujan, Scott S. Sewell. Original and 3 copies. c/s: y. (pdw)
4/11/95	[847013] Order filed by PF granting Appellees' motion to extend time to file eres [847012-1] Eres brief due 5/19/95 for DOI, for Bureau of Indian, for of Land, for Minerals Management, for Eddie F. Brown, for Delos Cy Jamison, for Manuel Lujan, for Scott S. Sewell. Parties served by mail. (pdw)
4/14/95	[849312] Joint Motion to Extend time to file appellee's brief until 5/19/95 and appellant's reply

Date	Description
	brief to June 8, 1995 titled "Join Motion for extension of time to Coordinate Briefing schedule" filed by Amoco Production, Southern Ute Indian. Original and 3 copies. c/s: y (fg)
4/19/95	[849314] Order filed by Judge(s) PF granting motion to extend time to file eres brief [849312-1] 5/19/95 for Amoco Production and for Southern Ute to file reply br 6/8/95 Parties served by mail. (fg)
4/27/95	[851663] Joinder filed by Fuel Resources, National Cooperative (to adopt brief of Amoco). Original and 7 copies. cs: y (fg)
5/2/95	[853350] Appellee's motion to adopt "Response Brief and supporting papers that will be filed by Amoco Production" [94-1579] (titled "Response Brief of Richmond Petroleum, Inc.") filed by Richmond Petroleum. Original and 3 copies. c/s: y. (pdw)
5/9/95	[853773] Order filed by PF granting Appellee's (Richmond Petroleum, Inc.) motion to adopt ". . . Response Brief and supporting papers that will be filed by Amoco Production Company. . ." be filed by Amoco Production Company. . ." [853350-1] Parties served by mail. (pdk)
5/11/95	[854555] Appellee's motion to adopt "response brief and supporting papers that will be filed by Amoco Production Company" [94-1579] filed by J.M. Huber Corp. Original and 3 copies. c/s: y. (pdw)
5/16/95	[855415] Order filed by PF - response (CORRECTED Motion to Adopt Eres Brief) due 5/31/95 for J.M. Huber Corp. Parties served by mail. (pdw)
5/16/95	[855463] Joinder titled "Response Brief of Land Owners Coalseam Committee" filed by LOCC. original and 8 copies c/s: y (fg)

Date	Description
5/19/95	[856442] Appellee's deficient brief filed by Amoco Production. Appellee's corrected brief due 5/30/95 for Amoco Production (pdw)
5/22/95	[856696] Appellee's motion to adopt "Response Brief and supporting papers that will be filed by Amoco Production Company" [94-1579] filed by J.M. Huber Corp. Original and 7 copies. c/s y. (pdw)
5/22/95	[856698] Order filed by PF granting Appellee's (J.M. Huber Corporation) motion to adopt "Response Brief and supporting papers that will be filed by Amoco Production Company" [856696-1] Parties served by mail. (pdw)
5/22/95	[856720] Appellee's brief filed by Delos Cy Jamison, Eddie F. Brown, Minerals Management, Bureau of Land, Bureau of Indian, DOI, Manuel Lujan, Scott S. Sewell. Original and 7 copies. c/s: y. Served on 5/19/95 Oral Argument? y (mbm)
5/23/95	[857545] Appellee's brief filed by Amoco Production. Original and 7 copies. c/s: y. Served on 5/23/95. Oral Argument? y. Appendix filed (3 volumes; Volume III is SEALED). Original and 1 appendix copy. (pdw)
5/24/95	[857507] FIRST notice of rules violation for Thomas S. Nichols for Appellee Amoco Production, Anthony J. Shaheen for Appellee Amoco Production, Charles L. Kaiser for Appellee Amoco Production, David E. Brody for Appellee Amoco Production (jt)
5/25/95	[857969] Order filed by PF Appellees' brief due 6/5/95 for Catherine Frances McElvain Harvey, Maxwell C. Anderson, Thornton H. McElvain, Catherine B. McElvain, Hondo Oil & Gas, Colorado Nat'l Bank, Colorado Nat'l, Louis M. Cummins, North Central Oil, Phillips Petroleum, Amax Oil

Date	Description
	& Gas, Inc., Bowen/Edwards Assoc. ,McKenzie Methane, Mobil Oil, Northwest Pipeline, and Williams Production pursuant to FRAP 31(a) and Rule 31.2. Parties served by mail. (afw)
5/30/95	[859025] Appellant's motion filed by Appellant Southern Ute Indian to extend time to file a reply brief until 6/22/95 [94-1579], to file an oversize reply brief 40 pages long [94-1579]. Original and 3 copies c/s: y (mbm)
5/30/95	[859026] Appellee's motion to adopt appellee's brief filed by Amoco [94-1579] filed by Colorado Nat'l, Colorado Nat'l Bank. Original and and 7 copies. c/s: y (mbm)
5/30/95	[859028] Order filed by PF granting Appellee/Respondent CNB (Ft. Collins and Denver) motion to adopt answer brief of Amoco. [859026-1] (mbm)
5/30/95	[859045] Appellee's motion to adopt "Response Brief and supporting papers that will be filed by Bowen/Edwards Assoc. Original and 3 copies. c/s: y. (pdw)
5/31/95	[859253] Appellee's motion to adopt Amoco's brief [94-1579] filed by Mobil Oil. Original and 3 copies. c/s: y (mbm)
5/31/95	[859255] Order filed by judge(s) PF granting Appellee/Respondent Mobile's motion to adopt [859253-1] (mbm)
5/31/95	[859418] Appellee's motion to adopt "Response Brief and supporting papers filed by Amoco Production Company" [94-1579] filed by Williams Production, Northwest Pipeline. Original and 3 copies c/s: y. (pdw)
6/1/95	[859502] Appellant's motion(s) Appellant/Petitioner motion to extend time to file apet reply

Date	Description
	brief, Appellant/Petitioner motion to file an oversize brief submitted to panel. (mbm)
6/1/95	[860546] Appellee's motion to adopt Amoco's answer brief [94-1579] filed by North Central Oil. Original and 7 copies. c/s: y (mbm)
6/2/95	[859762] Order filed by PF granting Appellee's (Northwest Pipeline and Williams Production Company) motion to adopt [859418-1], granting Appellee's (Bowen/Edwards) motion to adopt [859045-1] Parties served by mail. (pdw)
6/2/95	[860036] Joinder of filed by Amax Oil & Gas, Inc., titled "Brief of Union Pacific Oil & Gas Company, Formerly Known as Amax Oil & Gas, Inc." Original and 7 copies. c/s: y (fg)
6/5/95	[860374] Appellee's motion to adopt "Response Brief and supporting papers that will be filed by Amoco Production Company" [94-1579] filed by Louis M. Cummins, Maxwell C. Anderson, LOCC. Original and 3 copies. c/s: y. (pdw)
6/6/95	[860803] Appellee's motion to adopt Amoco's answer brief [94-1579] filed by Phillips Petroleum. Original and 7 copies. c/s: y (mbm)
6/6/95	[860804] Order filed by PF granting Appellee/Respondent motion to adopt [860803-1] (mbm)
6/6/95	[860832] Order filed by PF granting Appellee/Respondent North Central Oil's motion to adopt [860546-1] (mbm)
6/7/95	[860881] Order filed by PF granting Appellees' LOCC, Maxwell Anderson, and Louis Cummins motion to adopt Amoco's brief [860374-1] Parties served by mail. (pdw)
6/7/95	[860892] Order filed by Judge(s) Brorby, Kelly granting Appellant/Petitioner motion to file an oversize brief [859025-2] Parties served by mail. (mbm)

Date	Description
6/22/95	[865435] Appellant's reply brief filed by Southern Ute Indian. Original and 7 copies. c/s: y (mbm)
6/22/95	[865460] Appellant's motion filed by Appellant Southern Ute Indian [94-1579] to file supplemental appendix. Original and 3 copies c/s: y (mbm)
6/22/95	[865463] Supplemental appendix received from Southern Ute Indian, but not filed. Original and 2 copies. c/s: y (mbm)
6/27/95	[865944] Order filed by PF referring Appellant/ Petitioner motion to file appendix [865460-1] REFERRED TO PANEL ON THE MERITS. Parties served by mail. (mbm)
8/24/95	[880138] Hearing set for November 1995 Session, at Denver. (sls)
10/16/95	[892213] Appellee's supplemental authority filed by Amoco Production and submitted to panel. Original and 7 copies. c/s: y (fg)
10/31/95	[895590] Appellant's supplemental authority filed by Southern Ute Indian and submitted to panel. Original and 7 copies. c/s: y (fg)
11/1/95	[895880] Appellant's settlement conference report filed. Original and 3 copies (mbm)
11/1/95	[895882] Report of Settlement Conference submitted to panel. (mbm)
11/13/95	[898572] Letter filed by State of Colorado giving some background to a previous case they were involved in Original. c/s: y (afw)
11/13/95	[898574] Letter filed by State of Colorado giving background in a previous case submitted to panel. (Attorney Tom Shipps objects to said letter and or wants to respond.) (afw)

Date	Description
11/14/95	[898984] Appellee's supplemental authority filed by Minerals Management, Bureau of Land, Bureau of Indian, DOI, Manuel Lujan, Delos Cy Jamison, Eddie F. Brown, Scott S. Sewell and submitted to panel. Original and 7 copies. c/s y. (pdw)
11/15/95	[899423] Case argued and submitted to Judges Seymour, Coffin, McKay. (sis)
12/14/95	[906075] letter from landowner class member filed by (?) Original and 3 copies. cs: y (fg)
12/15/96	[906079] letter from landowner submitted to panel. (fg)
1/25/96	[916292] Motion to substitute parties [94-1579] filed by Amoco Production, Vincent A. Zarlengo, Richard A. Zarlengo. Original and 3 copies. c/s: y. (pdw)
1/25/96	[916294] Motion to dismiss Vincent A. Zarlengo and Richard A. Zarlengo as a parties [94-1579] filed by Vincent A. Zarlengo, Richard A. Zarlengo, Southern Ute Indian. Original and 3 copies. c/s: y. (pdw)
1/25/96	[916350] Notice of appearance filed by Dante L. Zarlengo as attorney for Vincent A. Zarlengo, Richard A. Zarlengo. CERT. OF INTERESTED PARTIES (y/n): y. (pdw)
1/29/96	[916296] Motion to substitute parties, motion to dismiss parties submitted to panel. (pdw)
2/6/96	[918585] Order filed by Judges Seymour, Coffin, McKay granting motion to substitute parties as to Anthony F. Zarlengo [916292-1], granting motion to dismiss parties as in Zarlengo [916294-1] Parties served by mail. (pdw)
9/16/96	[1069874] Notice of appearance filed by Mary V. Laitos as attorney for Independent Petro. CERT. OF INTERESTED PARTIES (y/n): n (hrs)

Date	Description
7/16/97	[1051412] Terminated on the Merits after Oral Hearing; Judgment is Reversed; Written, Signed, Published. Seymour, authoring judge; Coffin; McKay. [94-1579] (afw)
7/16/97	[1119912] Supplemental appendix filed by Appellant Southern Ute Indian. (afw)
7/30/97	[1055440] Bill of costs filed by the appellants Southern Ute Indian Tribe. Original and 3 copies. c/s: y. (hrs)
8/5/97	[1056851] Appellee's response filed by Bureau of Land, Bureau of Indian, DOI Original to the appellant's bill of costs. Original and 3 copies. c/s: y (hrs)
8/14/97	[1059809] Amended Bill of Costs filed by Southern Ute Indian Original and 0 copies. c/s: y. The amended bill of costs was submitted by fax. The original should be stamped as of today. Upon receipt of original, please replace copy in file. (mbm)
8/15/97	[1060484] Appellee's motion to extend time to file petition for rehearing until 9/16/97 [94-1579]. [94-1579] filed by Amoco Production and motion for leave to file a petition of five extra pages. Original and 3 copies. c/s: y (hrs)
8/18/97	[1060492] Appellee's motion()s [1060484-1] Appellee/Respondent motion to extend time to file petition for rehearing, [1060484-2] Appellee/Respondent motion for leave to file a petition of five extra pages submitted to panel. (hrs)
8/18/97	[1060831] Appellee's motion to extend time to file petition for rehearing until 9/16/97 [94-1579] filed by Bureau of Land, Bureau of Indian, DOI. Original and 3 copies. c/s: y (hrs)
8/19/97	[1060819] Bill of costs, the appellee's objection, and the amended bill costs submitted to panel. (hrs)

Date	Description
8/19/97	[1060836] Appellee's motion(s) [1060831-1] extend time to file petition for rehearing submitted to panel. (hrs)
8/19/97	[1061067] Appellee's response filed by Amoco Production Original and 3 copies. c/s: y (hrs)
8/20/97	[1061070] Appellee's response to the appellant's amended bill of costs filed by Amoco Production [1061067-1] submitted to panel. (hrs)
8/25/97	[1062526] Order filed by Judge(s) Seymour, Coffin, McKay granting Appellee/Respondent motion to extend time to file petition for rehearing [1060484-1], granting Appellee/Respondent motion to file a petition of five eztra pages [1060484-2] Petition for rehearing due 9/16/97. Parties served by mail. (hrs)
9/16/97	[1068331] Motion for leave to become amicus [94-1579] filed by Independent Petro, La Plata County. Original and 3 copies. c/s: y (hrs)
9/16/97	[1068333] Motion(s) [10683331-1] motion leave to become amicus filed by Movant Independent Petro, Movant La Plata County submitted to panel. (hrs)
9/16/97	[1068431] Petition for rehearing in banc [94-1579] filed by Amoco Production. Original and 14 copies. c/s: y (hrs)
9/16/97	[1068470] Motion for leave to become amicus [94-1579] filed by Campbell County Wyoming Mineral Owners. Original and 3 copies. c/s: y (hrs)
9/16/97	[1069578] Brief filed by Amicus Curiae CCWMO. Original and 14 copies. c/s: y Oral Argument? n (hrs)
9/16/97	[1069788] Brief filed by Amicus Curiae Independent Petro. Original and 14 copies. c/s: y Oral Argument? n (hrs)

Date	Description
9/16/97	[1069789] Brief filed by Amicus Curiae La Plata County. Original and 14 copies. c/s: n Oral Argument? n (hrs)
9/17/97	[1068432] Document [1068431-1] Petition for rehearing in banc filed by Appellee Amoco Production submitted to panel. (hrs)
9/17/97	[1068570] Motion for leave to become amicus [94-1579] filed by Cattlemen's Assoc. Original and 14 copies. c/s: y (hrs)
9/17/97	[1068572] Motion(s) [1068570-1] motion leave to become amicus filed by Movant Cattlemen's Assoc. submitted to panel. (hrs)
9/17/97	[1069576] Brief filed by Amicus Curiae Cattlemen's Assoc. Original and 14 copies. c/s: y Oral Argument? n (hrs)
9/18/97	[1069176] Motion for leave to become amicus [94-1579] filed by NARO. Original and 3 copies. c/s: y (hrs)
9/18/97	[1069180] Motion [1069176-1] leave to become amicus filed by Movant NARO submitted to panel. (hrs)
9/18/97	[1069790] Brief filed by Amicus Curiae NARO. Original and 14 copies. c/s: y Oral Argument? n (hrs)
9/19/97	[1069537] Order filed by Judge(s) Seymour, Coffin, McKay granting motions by Campbell County Wyoming Mineral Owners, La Plata County, Colorado, Independent Petroleum Association of Mountain States, La Plata County Cattlemen's Association become amicus [1069176-1] [1068470-1] Parties served by mail. The amici briefs will be filed as of the day they were received. (hrs)

Date	Description
9/22/97	[1069793] Amici Brief [1069790-1] filed by The National Association of Royalty Owners, La Plata County, Colorado, La Plata County Cattlemen's Association, Independent Petroleum Association of Mountain States, Campbell County Wyoming Mineral Owners', submitted to panel. (hrs)
9/25/97	[1070869] Order filed by Judge(s) Seymour, Coffin, McKay—response to the appellee's petition for rehearing with suggestion for en banc rehearing due 10/10/97 for Southern Ute Indian. Parties served by mail. (hrs)
10/3/97	[1073232] Appellant's motion filed by Appellant Southern Ute Indian to file a response of twenty pages. [94-1579]. Original and 4 copies c/s: y (hrs)
10/3/97	[1073233] Appellant's motion(s) [1073232-1] Appellant/Petitioner motion for general relief submitted to panel. (hrs)
10/7/97	[1074031] Order filed by Judges Seymour, Coffin, McKay, Porfilio, Anderson, Tacha, Baldock, Brorby, Kelly, Henry, Briscoe, Lucero, Murphy granting Appellant's motion to file a 20 page brief in response to the petition for rehearing. [1073232-1] Parties served by mail. (nak)
10/9/97	[1074934] Appellant's response filed by Southern Ute Indian to court's ordered response. Original and 14 copies. c/s: y. (nak)
10/9/97	[1074936] Appellant's response filed by Southern Ute Indian [1074934-1] to petition for rehearing submitted to panel. (nak)
11/4/97	[1082049] Motion to file brief out of time until 11/4/97 [94-1579] filed by Ignacio School Dist, Bayfield School Dist. Original and 3 copies. c/s: y (fg)

Date	Description
11/4/97	[1082052] Brief filed by Movant Ignacio School Dist, Movant Bayfield School Dist. Original and 7 copies. c/s: y Oral Argument? n (fg)
12/4/97	[1089640] Order filed by Judge(s) Seymour, Porfilio, Anderson, Tacha, Baldock, Brorby, Kelly, Henry, Briscoe, Murphy, McKay and Coffin granting Petition for rehearing in banc [1068431-1] supplemental brief due: 1/23/98 for LOCC, for Mosbacher U.S.A., for SG Interests I, LTD, for J. Magness, Inc., for Bell South Corp., for Albert E. Zarlengo, for Wells Fargo Bank, for Roderick L. Turner, for First Interstate, for PM Associates, for Jane P. Mosbacher, for Lisa Jean Kaindl, for Larry James Kaindl, for James Eric Kaindl, for Thomas L. Johnstone, for Helen Crosland Hendricks, for Liberty Tulsa, for J. L. Goggans, for Mary Jane Enochson, for Henry L. Enochson, for Jack W. Crosland, for Addie G. Crosby, for NCNB TX Nat'l Bank, for Susie M. Ciancio, for Donald C. Ciancio, for Mary Jean Balle, for Jack Balle, for Scott S. Sewell, for Catherine Frances McElvain Harvey, 12/29/97 for Southern Ute Indian, 1/23/98 for Amoco Production, for Shirley K. Adams, for Henry Ashworth, for Carla M. Aspaas, for Eric K. Aspass, for Helen Ruth Aspaas, for Laura Belle Aspaas, for Leta M. Adkins, for Rita M. Adkins, for Maxwell C. Anderson, for Earl A. Barker, for Tillie Flaks, for Cassio Frazzini, for Adele Frost, for Robert Galbasin, for Abel S. Gallegos, for H.A. Harmon, for Mabel McElvain, for Thornton H. McElvain, for Dorothy N. McKelvey, for Edwin L. McKelvey, for R. Franklin McKelvey, for W.R. McMahon, for McMurry Oil Company, for W. Clay Meredith, for W.A. Moncrief, for Roy E. Montgomery, for Forrest D. Miller, for Helen L. Miller, for Thomas S. Morrissey, for Fidel Lucero, for Richard C. Malcomb, for Suzanne Heath Manges, for Catherine B. McElvain, for Maurice C. Breen, for Horace F. Buchanan, for Hondo Oil & Gas, for Hyde Oil and Gas, for Charles Kettering, for A.B. Crosby, for Barbara Crosby, for David Crosby, for Colorado Nat'l Bank, for Colorado Nat'l, for Dorothy A. Corgin, for Kelly Cox, for George A. Bugg, for Carbone Investment, for Frederick E. Dickerson, for J.M. Eakes, for John Crow, for Montey Garnand, for Ruby Gibbs Goggans, for Margaret Crow, for Jack Carmack, for Rowland Carmack, for Christine Hamilton, for Hardin Simmons Univ., for Sally M. Etterbeck, for Minnie Flaks, for Robert McFerran Eakes, for Margaret Ellison, for Joseph C. Ciancio, for William Kemp Clark, for Manuel Cruz, for Louis M. Cummins, for Thomas J. Morrissey, for Emil Mosbacher, for Emil Mosbacher, for John David Mosbacher, for R. Bruce Mosbacher, for Myra Theresa Moulds, for North Central Oil, for H.L. Oliver, for Clara Onofrio, for Margaret C. Pargin, for Harold F. Payne, for Neville G. Penrose, for Ben M. Peterson, for Frederick Petrocco, for Phillips Petroleum, for James M. Raymond, for W.E. Rennie, for Thomas C. Romolo, for Benton E. Smullyen, for Clinton I Smullyen, for William Stirling, for J.L. Tatum, for Anna Carleo Tomeo, for Ernest Tomeo, for Turner Securities, for Richard W. Turner, for George C. Vance, for Anthony H. Veto, for Joseph F. Ware, for Albert E. Zarlengo, for Amax Oil & Gas, Inc., for Bowen/Edwards Assoc., for Fuel Resources, for J.M. Huber Corp., for Mobil Oil, for National Cooperative, for Northwest Pipeline, for Palo/Eagle Joint, for Richmond Petroleum, for Williams Production, for Manuel Lujan, for DOI, for Bureau of Indian, for Bureau of Land, for Minerals Management, for Eddie F. Brown, for Delos Cy. Jamison. "The Court Grants rehearing en banc on the issue of whether 'coal'

Date	Description
	as used in the Coal Land Acts of 1909 and 1910 unambiguously excludes or includes coal bed methane The court does not grant rehearing en banc on the question of whether Chevron deference is owed the 1981 Solicitor's Opinion." Judges Ebel and Lucero are recused. (fg)
12/4/97	[1105249] Order filed by Judges Seymour, McKay, Porfilio, Anderson, Tacha, Baldock, Brorby, Kelly, Henry, Briscoe, and Murphy reopening appeal. [94-1579) (afw)
1/19/98	[1097738] Supplemental brief on Rehearing En Banc filed by Appellant Southern Ute Indian. Original and 15 copies. c/s: y. (nak)
1/9/98	[1097750] Supplemental brief submitted to panel. (nak)
1/21/98	[1100157] Hearing set for March 1998 Session, at Denver, Colorado. (sls)
2/4/98	[1104125] Appellee's motion to extend time to file supplemental brief until 3/6/98 filed by Delos Cy Jamison, Eddie F. Brown, Minerals Management, Bureau of Land, Bureau of Indian, DOI, Manuel Lujan. Original and 3 copies, c/s: y (hrs)
2/4/98	[1104132] Federal appellees' [1104125-1] motion to extend time to file supplemental briefs submitted to panel. (hrs)
2/4/98	[1104289] Supplemental brief filed by Defendant Appellees Land Owners Coalseam Committee and Appellee Louis M. Cummins, Appellee Maxwell C. Anderson. Original and 8 copies. c/s: y. (fg)
2/4/98	[1104326] Supplemental brief submitted to panel. (fg)

Date	Description
2/4/98	[1104335] Motion [94-1579] For Leave To File Amicus Curiae Brief On Rehearing En Banc. filed by Nat'l Association of. Original and 18 copies. cs: y (fg)
2/4/98	[1104336] Amicus Curiae brief on Rehearing En Banc filed by Nat'l Association of. Original and 18 copies. c/s: y. Served on 2/3/98. (fg)
2/4/98	[1104337] Motion(s) motion for leave to file amicus brief on rehearing en banc, along with the supplemental brief filed by National Association of Royalty Owners submitted to panel. (fg)
2/5/98	[1104816] Notice of appearance filed by Ezekiel J. Williams as attorney for Amoco Production. CERT. OF INTERESTED PARTIES (y/n): n. (nak)
2/5/98	[1104850] Motion for leave to file amicus curiae brief on rehearing en banc [94-1579] filed by Independent Petro. Original and 14 copies. c/s: y (hrs)
2/5/98	[1104855] Motion to file amicus brief on rehearing en banc [94-1579] filed by CCWMO. Oriignal and 14 copies. c/s: y (hrs)
2/5/98	[1104928] Appellee's brief on rehearing en banc filed by Amoco Production. Original and 14 copies. c/s: y. Served on 2/5/98 (hrs)
2/5/98	[1108640] Brief on Rehearing En Banc filed by Amicus Curiae CCWMO. Original and 14 copies. c/s: y Oral Argument? n. (fg)
2/6/98	[1104888] Motion [1104850-1] for leave to file amicus brief on rehearing en banc filed by Amicus Curiae CCWMO submitted to panel. (hrs)
2/6/98	[1104929] Appellee's brief on rehearing en banc submitted to panel. (hrs)

Date	Description
2/6/98	[1105138] Motion [1104855-1] for leave to file an amicus curiae brief on rehearing en banc filed by Amicus Curiae Independent Petro submitted to panel. (hrs)
2/6/98	[1105261] Joinder in Defendant Class' Response Brief in the En Banc Proceeding filed by Ignacio School Dist. and Bayfield School Dist. Original and 5 copies. c/s: y (afw)
2/9/98	[1105272] Notice of Joinder in Defendant Class' Response Brief in the En Banc Proceeding filed by Bayfield School and Ignacio School submitted to panel. (afw)
2/9/98	[1105543] Order filed by Judges Seymour, Porfilio, Anderson, Tacha, Baldock, Brorby, Kelly, Henry, Briscoe, Murphy granting Appellees' motion (in part) to extend time to file brief [1104125-1]. Appellees' brief due 2/3/98 for for Manuel Lujan, for DOI, for Bureau of Indian, for Bureau of Land, for Minerals Management, for Eddie F. Brown, for Delos Cy Jamison. Parties served by mail. (sls)
2/9/98	[1105662] Notice of Joinder in Defendant Class' Response Brief in the En Banc Proceeding filed by La Plata County. Original and 14 copies. c/s: y (afw)
2/10/98	[1105663] Notice of Joinder in Defendant Class' Response Brief in the En Banc Proceeding submitted to panel. (afw)
2/11/98	[1106265] Appellant's motion filed by Appellant Southern Ute Indian for leave to file reply brief. Original and 7 copies c/s: y (hrs)
2/11/98	[1106267] Appellant's motion [1106265-1] for leave to file a reply brief submitted to panel. (hrs)
2/12/98	[1106493] Hearing RESET for March 1998 Session, at Denver, Colorado. Case is reset on

Date	Description
	the March 1998 Calendar from Thursday, March 19, 1998, Division 1, 2:00 p.m. to Tuesday, March 17, 1998, Division I, 2:00 p.m. Judge Initials: INB
2/18/98	[1107522] Order filed by PF granting motion by the Independent Petroleum Association of Mountain States [1104850-1]; and granting motion by the National Association of Royalty Owners [1104335-1] for leave to file briefs amici curiae. Parties served by mail. (sls)
2/19/98	[1108054] Order filed by PF granting Appellant/Petitioner motion for leave to file reply [1106265-1]—Due 2/23/98 for Southern Unte Indian. Parties served by mail. (fg)
2/23/98	[1108636] Order filed by PF granting motion of Campbell County Wyoming Mineral Owners for leave to file amicus brief on rehearing. [1104855-1] Parties served by mail. The brief received February 5, 1998 is filed as of that date. (fg)
2/23/98	[1108855] Appellant's supplemental reply brief on rehearing en banc filed by Southern Ute Indian and submitted to panel. Original and 14 copies. c/s: y (afw)
2/23/98	[1108947] Appellee's supplemental brief filed by Delos Cy Jamison, Eddie F. Brown, Minerals Management, Bureau of Land, Bureau of Indian, DOI, Manuel Lujan. Original and 14 copies. c/s: y (fg)
2/23/98	[1108954] Appellee's (Government's Supplemental brief on rehearing submitted to panel. (fg)
3/17/98	[1114522] Case argued and submitted en banc to Judges Seymour, McKay, Porfilio, Anderson, Tacha, Baldock, Kelly, Henry, Briscoe. (sls)

Date	Description
4/15/98	[1122705] Order filed by Judges Seymour, McKay, Porfilio, Anderson, Tacha, Baldock, Kelly, Henry and Briscoe granting Bayfield School District and Ignacio School Districts' motion to file brief out of time. Parties filed a joinder on 2/6/98. No brief is required. [1082049-1] Parties served by mail. (afw)
4/28/98	[1126429] Motion to substitute attorney filed by independent Petro. Original and 3 copies. c/s y. (nak)
4/29/98	[1126567] Order filed by PF granting motion to substitute attorney. [1126429-1] Parties served by mail. (nak)
7/20/98	[1147809] Terminated on the Merits after Oral Hearing; Reversed and Remanded; Written, Signed, Published. Heard en banc including Senior Judge McKay; Seymour, authoring judge. Judges Anderson, Tacha, and Baldock dissenting. Judges Brorby, Ebel, Lucero, and Murphy, recused. [94-1579] (hrs)
8/3/98	[1151826] Bill of Costs filed by Appellate Southern Ute Indian. Original and 3 copies. c/s: y. (pdw)
8/21/98	[1157147] Statement of costs in favor of Appellant filed. (pdw)
9/11/98	[1162354] Mandate issued to district court. Mandate receipt due 10/13/98 (fg)
9/14/98	[1163108] Mandate receipt filed. (fg)
10/19/98	[1172410] Letter from Supreme Court of the United States stating that the application for an extension of time within which to file a petition for writ of certiorari is extended to and including 11/18/98. (afw)

Date	Description
10/19/98	[1172526] notice of extension of time to file a petition for certiorari until 11/18/98 filed by Appellee Amoco Production et. al.,. Original and 0 copies. c/s: y. (fg)
11/25/98	[1182804] Petition for writ of certiorari filed on 11/20/98 Supreme Court Number 98-880. (hrs)

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF COLORADO

Case No. 91-B-2273

SOUTHERN UTE INDIAN TRIBE,
Plaintiff,
v.

AMOCO PRODUCTION COMPANY; SHIRLEY K ADAMS; RITA M. ADKINS; MAXWELL C. ANDERSON; ARCO OIL AND GAS COMPANY; HENRY ASHWORTH; ERIC K. ASPAAS; HELEN RUTH ASPAAS; LAURA BELLE ASPAAS; JACK BALLE; MARY JEAN BALLE; THE HEIRS OF EARL A. BARKER, INCLUDING EARL A. BARKER, JR., MARJORIE L. BLOMSTROM AND LUCILLE A. GRIMM; THE HEIRS OF MAURICE C. BREEN, DECEASED, INCLUDING BERNICE T. BREEN, DONALD H. BREEN, CLARISSA M. SWEENY, AND LUCILLE BREEN, IN HER INDIVIDUAL CAPACITY AND AS GUARDIAN OF RITA K. BREEN; THE HEIRS OF HORACE BUCHANAN, INCLUDING HELEN LEONARDELLI, JAY F. BUCHANAN AND JOEL BUCHANAN; THE HEIRS OF GEORGE A. BUGG; CARBONE INVESTMENT COMPANY; JACK CARMACK; ROWLAND CARMACK; DONALD C. CIANCIO; SUSIE M. CIANCIO; WILLIAM KEMP CLARK; COLORADO NATIONAL BANK OF DENVER AS TRUSTEE OF THE GEORGE VETO TRUST; THE COLORADO NATIONAL BANK OF LONGMONT AS CONSERVATOR OF THE ESTATE OF GLADYS N. FRAZZINI, DECEASED; DOROTHY A. CORGIN; NCNB TEXAS NATIONAL BANK, AS TRUSTEE OF THE KELLY COX TESTAMENTARY TRUST; ADDIE G. CROSBY; JACK W. CROSLAND, JR.; JOHN CROW, JR.; MARGARET CROW; LOUIS M. CUMMINS; THE HEIRS OF FREDERICK E. DICKERSON; J. M EAKES; ROBERT MCFERRAN EAKES; MARGARET ELLISON; HENRY L. ENOCHSON; MARY JANE ENOCHSON; SALLY M. ETTERBECK; THE HEIRS OF TILLIE FLAKS; CARLA M. ASPAAS FOLAND; THE HEIRS OF CASSIO

FRAZZINI; ROBERT A. GALBASIN; ABEL S. GALLEGOS; THE HEIRS OF MONTEY GARNAND; J. L. GOGGANS; RUBY GIBBS GOGGANS; LIBERTY TULSA, AS TRUSTEE OF THE CHRISTINE J. HAMILTON TRUST; HARDIN SIMMONS UNIVERSITY; THE HEIRS OF H. A. HARMAN, DECEASED, INCLUDING NANCY R. HARMAN; CATHERINE FRANCES MCELVAIN HARVEY; HELEN CROSLAND HENDRICKS; HYDE OIL AND GAS CORPORATION; THOMAS L. JOHNSTONE; JAMES ERIC KAINDL; LARRY JAMES KAINDL; LISA JEAN KAINDL; CHARLES KETTERING; FIDEL LUCERO; SUZANNE HEATH MANGES; KATHERINE B. MCELVAIN; THORNTON H. MCELVAIN, JR.; DOROTHY N. MCKELVEY; EDWIN L. MCKELVEY; R. FRANKLIN MCKELVEY; W. R. MCMAHON; MCMURRY OIL COMPANY; THE HEIRS OF W. A. MONCRIEF, DECEASED; THE HEIRS OF FORREST D. MILLER, DECEASED, INCLUDING JAMES M. RAYMOND, CORRINA MILLER GAY AND MAYDELL MILLER MAST; THE HEIRS OF HELEN L. MILLER, DECEASED, INCLUDING DAVID REESE MILLER, GIULA A. MILLER, HOLLY E. MILLER; MICHAEL HOYT MILLER, AND MYRA G. MILLER; THOMAS J. MORRISSEY; THOMAS S. MORRISSEY; MOSBACHER U.S.A., INC.; EMIL MOSBACHER, JR.; THE HEIRS OF JANE P. MOSBACHER. DECEASED; JOHN DAVID MOSBACHER; JOHN EMIL MOSBACHER III; R. BRUCE MOSBACHER; MYRA THERESA MOULDS; NORTH CENTRAL OIL CORORATION; H. L. OLIVER; CLARA ONOFRIO; MARGARET C. PARGIN; HAROLD F. PAYNE, JR.; NEVILLE G. PENROSE; BEN M. PATTERSON, JR.; FREDERICK PETROCCO; PHILLIPS PETROLEUM COMPANY; PM ASSOCIATES, A COLORADO GENERAL PARTNERSHIP; JAMES M. RAYMOND; THE FIRST INTERSTATE BANK OF DENVER, N.A. AS CO-TRUSTEE OF THE ESTATE OF W. E. RENNIE; THE HEIRS OF THOMAS C. ROMOLO, INCLUDING ROSEMARY A. ROMOLO; THE HEIRS OF WILLIAM STIRLING, INCLUDING MAUREEN CUNNINGHAM, LILLIAN MARY DUKES, HELEN MILEY, HARRY A. STIRLING, JOHN H.

STIRLING, THOMAS S. SUTHERLAND, AND THE WALDO E. RENNIE TESTAMENTARY TRUST; THE HEIRS OF J. L. TATUM, DECEASED, INCLUDING THE MARY A. TATUM TRUST, NCNB TEXAS NATIONAL BANK AS AGENT FOR THE TATUM FAMILY AGENCY NO. 4269 01, AND ROBERT S. TATUM; ANNA CARLEO TOMEO; ERNEST TOMEO; TURNER SECURITIES; RICHARD W. TURNER, JR.; RODERICK L. TURNER; WELLS FARGO BANK, AS TRUSTEE OF THE GEORGE C. VANCE TRUST; ANTHONY H. VETO; JOSEPH F. WARE, JR.; ALBERT E. ZARLENGO, JR., AS TRUSTEE FOR THE ALBERT E. ZARLENGO TRUST; ANTHONY F. ZARLENGO; JOHN DOE AND ALL OTHER UNKNOWN PERSONS CLAIMING AN INTEREST IN THE MINERAL ESTATE LOCATED WITHIN THE N/2 OF SECTION 12, T33N, R8W, N.M.P.M., LA PLATA COUNTY, COLORADO; AMAX OIL & GAS, INC.; BELL SOUTH CORPORATION HEALTH CARE TRUST; BOWEN/EDWARDS ASSOCIATES, INC.; CONOCO, INC.; FUEL RESOURCES DEVELOPMENT COMPANY; J. M. HUBER CORPORATION, OIL AND GAS DIVISION; J. MAGNESS, INC.; MARKWEST ENERGY PARTNERS LIMITED; MCKENZIE METHANE CORPORATION; MERIDIAN OIL, INC.; MOBIL OIL CORPORATION; NATIONAL COOPERATIVE REFINERY ASSOCIATION; NORTHWEST PIPELINE CORPORATION; PABLO OPERATING COMPANY; PALO PETROLEUM, INC.; PALO/EAGLE JOINT VENTURES; RICHMOND PETROLEUM, INC.; SG INTERESTS I, LTD.; TIFFANY GAS COMPANY; UNION TEXAS PETROLEUM CORPORATION; WILLIAMS PRODUCTION COMPANY; JOHN DOE OIL COMPANY AND ALL OTHER UNKNOWN PERSONS OR ENTITIES CLAIMING LEASEHOLD WORKING INTERESTS OR OPERATING RIGHTS TO EXPLORE FOR, PRODUCE OR DEVELOP COALBED METHANE OR COAL CONSTITUENTS FROM COAL OR COAL STRATA RESERVED BY THE UNITED STATES IN PATENTS ISSUED UNDER THE ACT OF MARCH 3, 1909, OR THE ACT OF JUNE 22, 1910, FOR LANDS LOCATED WITHIN THE EXTERIOR BOUNDARIES OF THE SOUTHERN UTE INDIAN

RESERVATION, AND WHICH ENTITIES HAVE NOT OBTAINED TRIBAL CONSENT TO AND FEDERAL APPROVAL OF SAID EXPLORATION, PRODUCTION OR DEVELOPMENT ACTIVITIES; MANUEL LUJAN, JR., SECRETARY OF THE UNITED STATES DEPARTMENT OF THE INTERIOR; THE UNITED STATES DEPARTMENT OF THE INTERIOR AND ITS SUBORDINATE AGENCIES; THE BUREAU OF INDIAN AFFAIRS; THE BUREAU OF LAND MANAGEMENT; THE MINERALS MANAGEMENT SERVICE; EDDIE F. BROWN, ASSISTANT SECRETARY OF THE BUREAU OF INDIAN AFFAIRS; DELOS CY JAMISON, DIRECTOR OF THE BUREAU OF LAND MANAGEMENT; SCOTT S. SEWELL, DIRECTOR OF THE MINERALS MANAGEMENT SERVICE; CLASS OF DEFENDANTS SITUATED SIMILARLY TO THOSE NAMED NON-GOVERNMENTAL DEFENDANTS WHO CLAIM OWNERSHIP OF AN INTEREST IN COALBED METHANE AND OTHER COAL CONSTITUENTS OR CLAIM THE RIGHT TO EXPLORE FOR, DEVELOP OR PRODUCE THOSE SUBSTANCES FROM COAL OR COAL STRATA RESERVED BY THE UNITED STATES IN PATENTS ISSUED UNDER THE ACT OF MARCH 3, 1909, OR THE ACT OF JUNE 22, 1910, FOR LANDS LOCATED WITHIN THE EXTERIOR BOUNDARIES OF THE SOUTHERN UTE INDIAN RESERVATION AND WHICH CLASS MEMBERS HAVE NOT OBTAINED TRIBAL CONSENT TO AND FEDERAL APPROVAL OF SAID INTERESTS OR RIGHTS,

Defendants.

[FIRST AMENDED COMPLAINT]

COMES NOW the Plaintiff, Southern Ute Indian Tribe, hereinafter referred to as "the Tribe," by and through the undersigned, and for claims for relief against the Defendants, alleges:

NATURE OF THE COMPLAINT

1. Without being limited by this summary statement, this is a civil action in which the Tribe seeks various forms of relief required to protect the Tribe from the extraction

of coalbed methane, water, carbon dioxide, and other constituents of coal or coal strata reserved by the United States for the perpetual benefit and ownership of the Tribe. Coalbed methane, water, carbon dioxide, and other coal constituents are integral components of the Tribe's coal, portions of which are being extracted from the Tribe's coal, portions of which are being extracted from the Tribe's c oal without the consent of the Tribe. Pursuant to private oil and gas leases issued by owners of the oil and gas estates underlying the same lands on which the Tribe owns the coal, Defendant Amoco Production Company, and the other Defendant Oil Companies have drilled into the Tribe's coal and have extracted substances from the Tribe's coal or coal strata, including coalbed methane and other coal constituents. The production method physically damages the integrity of the Tribe's coal, and in many instances, alters the coalbed methane from an absorbed or sorbed substance to a free gas. The coalbed methane is commercially produced by Amoco Production Company and the other Defendant Oil Companies which assert that the coalbed methane is a gas subject to extraction under private oil and gas leases, notwithstanding the fact that the methane is derived from within coal strata reserved for the benefit of the Tribe and notwithstanding the fact that the methane is an integral component of the Tribe's coal, not generally subject to migration in the absence of the desorption process. The Tribe is receiving no compensation for the commercial extraction of its coal or coal constituents.

The United States of America, trustee for the Tribe, acting by and through the United States Department of the Interior, the Secretary of the Interior and agencies within the Department of the Interior, has acquiesced in the extraction of coalbed methane and other coal constituents from the Tribe's coal in disregard of the fiduciary obligations those entities and officials owe the Tribe in the management of tribal natural resources.

The Tribe seeks a declaration that it owns the beneficial interest in the coal, including all substances located in the coalbeds and coal strata, including all constituent components of the coal, underlying the lands within the reservation where the surface estate was severed from the coal estate by the United States during homesteading undertaken pursuant to the Acts of March 3, 1909, and June 22, 1910; that the extraction of coalbed methane, water, carbon dioxide, and coal constituents from the Tribe's coal without tribal consent constitutes an unlawful trespass against the Tribe; that the United States Department of the Interior, the Secretary of the Interior, and the agencies and officials within the Department of the Interior have a duty to protect the Tribe from the unauthorized extraction of substances found within the coal strata or coalbeds, including constituent components of the Tribe's coal; and that the United States has breached that duty.

Further, the Tribe seeks an order mandating that the Secretary of the Interior take such action necessary to curtail extraction of coalbed methane and other substances located within coal strata or coalbeds, including coal constituents, owned by the Tribe in the absence of tribal consent.

Additionally, the Tribe seeks compensation from Amoco Production Company, the other Defendant Oil Companies, and the oil and gas estate owners for the value of extracted substances wrongfully taken from the Tribe. The Tribe further seeks an order transferring to the Tribe ownership of all equipment and facilities installed by or on behalf of those Defendants on the premises in question utilized in the extraction of coalbed methane, water and other substances located within the Tribe's coal or coal strata insofar as said equipment and facilities are necessary for production of the Tribe's coalbed methane. In those instances permitted by law, including those instances in which the conduct of the Defendant has been occasioned by willful

disregard of the Tribe's ownership interests, the Tribe requests that the facilities be transferred to the Tribe's ownership without any deduction from production revenue or other compensation to the Defendant.

Effective April 26, 1982, the Southern Ute Indian Tribe enacted a severance tax ordinance imposing upon oil and gas operators a tax related to the severance of oil and gas resources from tribal lands. The Tribe's ordinance was amended, effective on April 27, 1990, by enactment of Tribal Ordinance No. 89-01. Defendant Amoco Production Company and other Defendant Oil Companies have not paid and have refused to pay tribal severance taxes upon the severance of coalbed methane from tribal coal in those instances in which the extraction of methane has been conducted or is being conducted pursuant to private oil and gas leases. The Tribe requests that the Court exercise its pendant jurisdiction and direct Defendant Amoco Production Company and the Defendant Oil Companies to pay past and future taxes, together with penalties and interest, authorized by the tribal severance tax ordinances with respect to coalbed methane severance from tribal coal, coalbeds or coal strata.

The magnitude of this case is significant and includes ownership issues affecting approximately 200,000 acres of land, approximately twenty oil and gas companies, several hundred coalbed methane wells, and an estimated 20,000 individuals who own interests in the oil and gas estates underlying lands where the Tribe owns the coal. The only practical mechanism for protecting the Tribe's interests in all the affected lands within the reservation, while at the same time insuring that each affected party's interests are adequately represented, is to request certification of a class of defendants who are situated similarly to the named defendants.

JURISDICTION AND VENUE

2. This Court has jurisdiction to decide this case and to grant the relief requested under 28 USC § 1331, 28 USC § 1361 and 28 USC § 1362.

PARTIES

3. The Southern Ute Indian Tribe is a federally recognized Indian tribe organized pursuant to the Indian Reorganization Act of 1934, Ch. 576, 48 Stat. 984 (codified as amended at 25 USC §§ 461, 462, 463, 464, 465, 466-470, 471-473, 474, 475, 476-478, 479), hereinafter referred to as the "IRA."

4. Amoco Production Company is an oil and gas exploration company licensed to conduct business as a foreign corporation in the state of Colorado. As an oil and gas lessee, Amoco has engaged in the extraction of coalbed methane gas and other coal constituents from tribal coal or coal strata.

5. Amax Oil & Gas, Inc.; Bell South Corporation Health Care Trust; Bowen/Edwards Associates, Inc.; Conoco, Inc.; Fuel Resources Development Company; J. M. Huber Corporation, Oil and Gas Division; J. Magness, Inc.; Markwest Energy Partners Limited; McKenzie Methane Corporation; Meridan Oil, Inc.; Mobil Oil Corporation; National Cooperative Refinery Association; Northwest Pipeline Corporation; Pablo Operating Company; Palo Petroleum, Inc.; Palo/Eagle Joint Ventures; Richmond Petroleum, Inc.; S. G. Interests I, Ltd.; Tiffany Gas Company, Union Texas Petroleum Corporation; and Williams Production Company are, upon information and belief, entities that own leasehold working or reversionary interests thereto or operating rights associated with private oil and gas leases pursuant to which said entities claim the right to develop coalbed methane gas and other coal constituents from tribal coal or coal strata. The entities listed in this Averment are hereinafter referred to as the 'Defendant Oil Companies.'"

6. Manuel Lujan, Jr., the Secretary of the Interior, is charged by law to administer the Indian Mineral Leasing

Act of 1938, Ch. 198, Sec. 1, 52 Stat. 347 (codified as 25 USC § 396a, *et seq.*); the Indian Mineral Development Act of 1982, P.L. 97-382 (codified as 25 U.S.C. § 2101, *et seq.*); and the IRA, all of which require tribal consent to the development of minerals held in trust by the United States of America for the benefit of the Tribe. As a representative of the United States Government, Secretary Lujan is further charged with the highest fiduciary duty of protection to federally recognized Indian tribes and their natural resources.

7. The United States Department of the Interior is the federal executive department responsible for overseeing the development of tribal lands, including minerals, in a manner consistent with the federal trust responsibility to Indian tribes. The duty of overseeing development of minerals owned by the Tribe is divided among the Bureau of Indian Affairs (leasing and land records), the Minerals Management Service (royalty accounting, valuation, and auditing), and the Bureau of Land Management (subsurface management, facility management). All three of the agencies are part of the United States Department of the Interior.

8. Eddie F. Brown, the Assistant Secretary of the Bureau of Indian Affairs; Delos Cy Jamison, Director of the Bureau of Land Management; and Scott S. Sewell, Director of the Minerals Management Service are the supervising officials responsible for carrying out the duties of each of their respective agencies within the Department of the Interior. Hereinafter, the defendants referred to in Averments 6, 7 and 8 are referred to as "the Federal Defendants."

9. All other named Defendants claim an interest in the oil and gas estate underlying lands subsequently described in Averment 14, referred to as the "Subject Lands." These Defendants are hereinafter referred to as "Oil and Gas Lessors." The Oil and Gas Lessors are successors to home-

stead patent recipients who acquired title pursuant to the Coal Lands Act of 1910, Ch. 318, 36 Stat. 583 (codified as 30 USC §§ 83-85), which Act and the patents issued pursuant to it reserved to the United States "all coal in the land so granted, and to it, or persons authorized to buy it, the right to prospect for, mine and remove coal from the same." The Oil and Gas Lessors, or their predecessors in interest, have issued oil and gas leases to Amoco Production Company, its predecessors or successors, pursuant to which extraction of coalbead methane and other coal constituents is taking place.

10. All named Defendants, except for the Federal Defendants, are sued both individually and as representatives of a class of persons who claim an ownership interest in coalbed methane or other coal constituents, or claim the right to explore for, develop or produce those substances from coal or coal strata reserved by the United States in patents issued under the Act of March 3, 1909, Ch. 270, 35 Stat. 844 (codified as 30 U.S.C. § 81) or under the Coal Lands Act of 1910 for lands located within the exterior boundaries of the Southern Ute Indian Reservation and who have not obtained tribal consent to and federal approval of said interests or rights.

11. The above-described class is estimated to exceed 20,000 persons and the members of the class are so numerous that joinder of all members is impracticable; all questions of law and fact related to the fundamental issues in this care are common to the class; the defenses of the representative defendants are typical of the defenses of the class; and the representative defendants will fairly and adequately protect the interests of the class.

12. The prosecution of separate actions against individual members of the class would create a risk of inconsistent or varying adjudications with respect to individual members of the class which would establish incompatible standards of conduct for the Tribe. Additionally, adjudi-

cation of this case as to the representative defendants would as a practical matter be dispositive of the interests of the class defendants not named as defendants, or would substantially impair or impede the ability of those unnamed defendants to protect their interests.

13. The Tribe, in asserting its ownership interests to the coal substances contained in the coal or coal strata at issue, or in refusing to permit extraction of coalbed methane and other coal constituents, has acted or refused to act on grounds generally applicable to the class, thereby making declaratory relief and final injunctive relief appropriate with respect to the class as a whole.

14. The questions of law and fact common to the class predominate over questions affecting only individual members and a defendant class action is superior to other procedures for the fair and efficient adjudication of the controversy.

GENERAL ALLEGATIONS

15. As a consequence of the Tribe's reorganization under the IRA, the United States Congress in 1938 enacted legislation that authorized the restoration of certain previously ceded vacant, undisposed of lands within the boundaries of the reservation back to the Tribe. As of June 28, 1938, Ch. 776, 52 Stat. 1209, 1211. Restoration of undisposed of ceded lands to tribal ownership, including the coal at issue in this case, was accomplished pursuant to the Order of Restoration of September 14, 1938, issued by the Acting Secretary of the Interior under authority conferred by the IRA (25 USC §§ 463,478).

16. The Tribe is the beneficial owner of coal underlying the lands located in the N/2 of Section 12, Township 33 North, Range 8 West, N.M.P.M., La Plata County, Colorado, hereinafter referred to as "Subject Lands."

17. Prior to restoration to the Tribe of the coal underlying the subject lands, the United States of America issued a patent to Douglas H. Campbell on October 11, 1919,

recorded at Book 149, Page 205, of the records of the Clerk and Recorder of La Plata County, Colorado, granting to the patentee a tract of land located in the W/2 NE/4, NE/4 NW/4, and the NW/4 SE/4 of Section 12, Township 33 North, Range 8 West, N.M.P.M., La Plata County, Colorado, hereinafter referred to as the "Campbell Patent."

18. Prior to restoration to the Tribe of the coal underlying the Subject Lands, the United States of America issued a patent to Joe Garnard, on October 6, 1920, recorded at Book 198, Page 253, of the records of the Clerk and Recorder of La Plata County, Colorado, granting to the patentee a tract of land located in the NW/4 NW/4 of Section 12, Township 33 North, Range 8 West, N.M.P.M., La Plata County, Colorado, hereinafter referred to as "the Garnand Patent."

19. Prior to restoration to the Tribe of the coal underlying the Subject Lands, the United States of America issued a patent to Isabilita Martinez, infant child of Bendito Martinez, on March 20, 1923, recorded at Book 304, Page 533, of the records of the Clerk and Recorder of La Plata County, Colorado, granting to the patentee a tract of land located in the S/2 NW/4 of Section 12, Township 33 North, Range 8 West, N.M.P.M., La Plata County, Colorado, hereinafter referred to as the "Martinez Patent." The Campbell Patent, the Garnard Patent, and the Martinez Patent reserved to the United States all coal in the land so granted, together with the right to prospect for, mine and remove coal in accordance with the Coal Lands Act of June 22, 1910, 36 Stat. 583.

20. The Tribe was the beneficiary of the federal reservation of the coal to the United States at the time said patent reservations were made; however, prior to restoration to tribal ownership, said coal could have been leased pursuant to the public mineral laws then in force, provided that the royalty proceeds from such activity were to be saved by the United States for the Tribe's benefit.

21. None of the Defendants or their predecessors in interest obtained an interest in the coal underlying the Subject Lands or other lands similarly situated within the exterior boundaries of the Southern Ute Indian Reservation pursuant to entry under the public mineral laws then in force.

22. Following restoration of the coal to tribal ownership pursuant to the Order of Restoration of September 14, 1938, said coal could no longer be developed under the public land laws, but rather was subject to federal laws governing the leasing of Indian minerals.

23. The reservation of the coal to the United States and the restoration of the reserved coal to the ownership of the Tribe included all substances contained within beds or strata of coal, including all substances that were constitutent, inherent, or integral components of the coal.

24. Under the provisions of federal law, including the Indian Mineral Leasing Act of 1938, 25 USC § 396a *et seq.*, and the Indian Mineral Development Act of 1982, 25 USC §§ 2101, *et seq.*, the consent of the Tribe is required as a condition precedent to conducting exploration for and development of tribal minerals.

25. The Tribe has not consented to the extraction of substances found within its coalbeds or strata or to the extraction of substances that are constituent, inherent, or integral components of the coal underlying the Subject Lands or other lands similarly situated within the exterior boundaries of the Southern Ute Indian Reservation.

26. The Tribe has title that is superior to that of Defendant Amoco Production Company and the Oil and Gas Lessors with respect to the coal underlying the Subject Lands, and the Tribe has title that is superior to that of the Defendant Oil Companies and the Defendant class members with respect to other lands similarly situated within the exterior boundaries of the Southern Ute Indian Reservation, including all substances contained within beds

or strata of that coal, or all substances that are constituent, inherent, or integral components of that coal.

27. Based upon the Averments contained in this Complaint, a case or controversy exists between the parties.

FIRST CLAIM FOR RELIEF

28. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 27.

29. The Defendant Oil and Gas Lessors and Defendant Amoco Production Company have refused to and continue to refuse to honor or recognize the Tribe's ownership of all substances located within the coalbeds or strata underlying the Subject Lands, including constituent, inherent or integral components of the coal.

30. In the absence of a judicial determination recognizing that the Tribe owns all substances located within the coalbeds or strata underlying the Subject Lands, the Tribe will suffer immediate and continuing injury.

SECOND CLAIM FOR RELIEF

31. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 30.

32. Defendant Oil and Gas Lessors and Defendant Amoco Production Company, through their agents or employees, have trespassed upon tribal land by entering into the coal owned by the Tribe underlying the Subject Lands, and by extracting substances located within the Tribe's coalbeds or strata, including constituent, inherent and integral components of the Tribe's coal, without tribal consent.

33. The trespass of said Defendants has resulted in damage to the Tribe arising from the depletion of substances located within the Tribe's coalbeds or strata, including the depletion of constituent, inherent, and integral components of the Tribe's coal in an amount to be proven at trial.

THIRD CLAIM FOR RELIEF

34. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 33.

35. Defendant Amoco Production Company has committed the trespass into the Tribe's coal underlying the Subject Lands and has extracted substances from the Tribe's coalbeds or strata, or has extracted constituent, inherent, and integral components of the Tribe's coal, knowingly, willfully and intentionally, and with no regard for the Tribe's ownership of said substances.

36. Defendant Amoco Production Company's trespass into the Tribe's coal underlying the Subject Lands was commenced after Defendant Amoco Production Company had been made aware of the Tribe's assertions of ownership.

37. As compensation for damages suffered by the Tribe as a result of Defendant Amoco Production Company's intentional and willful trespass, the Tribe is entitled to the value of the substances extracted from the coal without deduction for labor, extraction, lifting, processing, or marketing.

FOURTH CLAIM FOR RELIEF

38. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 37.

39. As a result of extraction of substances located within the Tribe's coalbeds or strata underlying the Subject Lands, or of substances that were constituent, inherent, and integral components of that coal, Defendant Amoco Production Company has wrongfully altered said substances from realty to personalty.

40. The substances extracted from the Tribe's coalbeds or strata, including substances that were constituent, inherent, and integral components of the Tribe's coal which were reduced to personal possession by Defendant Amoco

Production Company, were beneficially and constructively owned by the Tribe.

41. Defendant Amoco Production Company has wrongfully and without tribal consent converted the Tribe's coal or coal constituents underlying the Subject Lands by extracting, selling and disposing of same for its own principal benefit.

42. Defendant Amoco Production Company has failed to compensate the Tribe for the value of substances it has wrongfully converted.

43. Said conversion by Defendant Amoco Production Company has resulted in damage to the Tribe in an amount equal to the value received or receivable for the substances wrongfully sold or disposed of by Defendant Amoco Production Company.

FIFTH CLAIM FOR RELIEF

44. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 43.

45. Said conversion by Defendant Amoco Production Company has been conducted knowingly, willfully, and intentionally, and in disregard of the Tribe's ownership of all substances located within the Tribe's coalbeds or strata, or in disregard of the Tribe's ownership of constituent, inherent, and integral components of the Tribe's coal.

46. As compensation for damages suffered by the Tribe as a result of Defendant Amoco Production Company's intentional and willful conversion, the Tribe is entitled to additional punitive and exemplary damages to be established at trial.

SIXTH CLAIM FOR RELIEF

47. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 46.

48. In entering into the Tribe's coal underlying the Subject Lands, Defendant Amoco Production Company has damaged the integrity of the Tribe's coal.

49. In extracting coalbed methane and other substances located within the Tribe's coalbeds or strata underlying the Subject Lands, or by extracting substances which are constituent, inherent, and integral components of the Tribe's coal, Defendant Amoco Production Company has altered the structure and caused volumetric shrinkage of the Tribe's coal.

50. By entering into the Tribe's coal underlying the Subject Lands, and by placing facilities in the Tribe's coal, Defendant Amoco Production Company has caused damage to the Tribe by increasing the future costs and decreasing the future efficiency of any efforts the Tribe may undertake to mine said coal commercially.

51. The Tribe is entitled to compensation for damages to be proven at trial resulting from the physical incidental damage to the coal which has decreased its mineability, and the Tribe is entitled to compensation for damages resulting from alteration of the structure and the volumetric shrinkage of the Tribe's coal, underlying the Subject Lands.

SEVENTH CLAIM FOR RELIEF

52. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 51.

53. In the absence of injunctive relief, Defendant Oil and Gas Lessors and Defendant Amoco Production Company threaten to continue efforts to explore for, to develop and to extract substances from the Tribe's coalbed or strata, or substances that are constituent, inherent, and integral components of the Tribe's coal underlying the Subject Lands, to the irreparable harm and injury of the Tribe.

EIGHTH CLAIM FOR RELIEF

54. Plaintiff hereby incorporates by refererence the allegations contained in Averments 1 through 53.

55. The Tribe is the owner of coal underlying a significant amount of additional land located within the Tribe's reservation, which coal was reserved for the benefit of the Tribe by the United States in patents issued pursuant to the Coal Lands Act of 1909 and the Coal Lands Act of 1910, and which coal was restored to the Tribe pursuant to the Order of Restoration of September 14, 1938. Such coal is hereinafter referred to as "Reserved and Restored Coal."

56. With respect to the Reserved and Restored Coal, Defendant Amoco Production Company, the Defendant class members, and the Defendant Oil Companies have conducted and threatened to continue to conduct coalbed methane exploration, extraction and development activities in a manner similar to and under conditions similar to those described in the foregoing Averments, without tribal consent.

57. With respect to the Reserved and Restored Coal, the activities and planned activities of Defendant Amoco Production Company, the Defendant class members, and the Defendant Oil Companies are unlawful and impermissible, and those activities and planned activities are identical in all fundamental respects with those undertaken by Defendant Amoco Production Company and the Oil and Gas Lessors with respect to the Subject Lands.

58. With respect to the Reserved and Restored Coal, Defendant Amoco Production Company, the Defendant class members, and the Defendant Oil Companies, refuse to recognize the Tribe's paramount right to the coal, coalbed methane or other substances located within the Tribe's coalbeds or strata, or to constituent, inherent and integral components of the Tribe's coal.

59. As a result of activities undertaken by Defendant Amoco Production Company, the Defendant class members, and the Defendant Oil Companies in relation to the Reserved and Restored Coal, the Tribe has suffered injury and damage to be established on a particularized basis with respect to each affected tract in a manner similar to that described in the foregoing Averments.

NINTH CLAIM FOR RELIEF

60. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 59.

61. In wrongfully extracting coalbed methane from the Tribe's Reserved and Restored Coal, Defendant Amoco Production Company, the Defendant Oil Companies, and the Defendant class members, have permanently severed and removed from tribal lands located within the Southern Ute Indian Reservation a valuable, non-renewable resource.

62. Defendant Amoco Production Company and the Defendant Oil Companies have failed to pay severance tax to the Tribe as required by Tribal Ordinance No. 89-01, approved by the Secretary of the Interior, on April 27, 1990, or pre-existing tribal severance tax ordinances, for the severance, saving and removal of methane from the Subject Lands and the Reserved and Restored Coal.

63. The Tribe is entitled to payment of all taxes, penalties and interest as provided by Ordinance No. 89-01, or pre-existing tribal severance tax ordinances, attributable to the severance, saving and removal of coalbed methane from tribal lands located within the Southern Ute Indian Reservation where the Tribe owns Reserved and Restored Coal and where Defendant Amoco Production Company or the Defendant Oil Companies have extracted or are extracting coalbed methane from tribal Reserved and Restored Coal.

TENTH CLAIM FOR RELIEF

64. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 63.

65. With respect to the Subject Lands or portions of the Reserved and Restored Coal, Defendant Amoco Production Company and some or all of the Defendant Oil Companies have applied for and obtained the permission of officials of the State of Colorado, including, but not limited to, the Colorado Oil and Gas Conservation Commission, to drill into the Tribe's coal.

66. With respect to the Subject Lands or portions of the Reserved and Restored Coal, Defendant Amoco Production Company and some or all of the Defendant Oil Companies have participated in discussions and hearings wtih officials of the State of Colorado in order to obtain approval for the extraction of substances from the Tribe's coalbeds or strata or the extraction of constituent, inherent and integral components of the Tribe's Reserved and Restored Coal.

67. Any permission, grants of authority, or orders issued by officials of the State of Colorado or its political subdivisions facilitating the coalbed methane activities of Defendant Amoco Production Company and the Defendant Oil Companies have been obtained as a result of the joint participation of said Defendants with officials of the State of Colorado under color of state law.

68. In seeking and obtaining the sanction of officials of the State of Colorado to the activities of said Defendants, and in extracting substances from the Tribe's coalbeds or strata or extracting constituent, inherent and integral components of the Tribe's Reserved and Restored Coal or from coalbeds underlying the Subject Lands pursuant to said state action, Defendant Amoco Production Company and the Defendant Oil Companies have deprived the Tribe of rights guaranteed by federal laws, in-

cluding, but not limited to: 25 USC § 177, 25 USC § 396a, 25 USC § 476, and 25 USC § 2102 *et seq.*

69. With respect to the Reserved and Restored Coal and the Subject Lands, Defendant Amoco Production Company and the Defendant Oil Companies have deprived the Tribe of rights secured by federal laws, and said Defendants are liable for redress of injuries resulting to the Tribe in accordance with 42 USC § 1983.

70. In vindication of its rights under 42 USC § 1983, the Tribe is entitled to reimbursement of reasonable attorneys fees and costs in accordance with 42 USC § 1988.

ELEVENTH CLAIM FOR RELIEF

71. Plaintiff hereby incorporates by reference the allegations contained in Averments 1 through 70.

72. The Federal Defendants have served throughout the period of time during which extraction of coalbed methane has taken place on the Southern Ute Indian Reservation and continue to serve as the federal trustee for the Southern Ute Indian Tribe with respect to management of mineral lands owned by the United States for the benefit of the Tribe.

73. The Federal Defendants have been required to act and are required to act in the future as fiduciaries for the Southern Ute Indian Tribe with respect to all Reserved and Restored coal, as well as the Subject Lands.

74. The Federal Defendants have breached their fiduciary duties to the Tribe by permitting or acquiescing in the extraction of substances from the coalbeds or strata, or the extraction of constituent, inherent, and integral components of the Tribe's Reserved and Restored Coal and the Subject Lands without the consent of the Tribe and in violation of various federal laws including, but not limited to, 25 USC § 177, 25 USC § 396a, 25 USC § 2101 *et seq.*, and 25 USC § 476.

75. In violating the federal statutes regulating the methods by which tribal mineral interests may be exploited, the Federal Defendants have deprived and threaten to continue to deprive the Tribe of valuable property rights without due process of law in violation of the United States Constitution, Amendment V.

76. In the absence of mandatory relief provided by this Court, the Federal Defendants will continue to breach their fiduciary, statutory, and constitutional duties owed to the Tribe to the irreparable harm of the Tribe.

WHEREFORE, Plaintiff Southern Ute Indian Tribe prays that the Court enter an Order granting the following:

1. A declaratory judgment determining the following:

(a) The Tribe is the beneficial owner of the coal underlying the Subject Lands.

(b) The Tribe is the beneficial owner of Reserved and Restored Coal located within the boundaries of the Southern Ute Indian Reservation.

(c) Ownership of the coal by the Tribe includes ownership of all substances located within coalbeds or strata reserved and restored to the Tribe, or of all constituent, inherent, and integral components of the coal underlying the Subject Lands and Reserved and Restored Coal.

(d) That mineral development and commercial mining activities related to the coal underlying the Subject Lands and the Reserved and Restored Coal, including the extraction of coalbed methane and water, cannot lawfully take place without the consent of the Tribe.

(e) That the Federal Defendants have a fiduciary trust duty, statutory duties, and constitutional duties that preclude those Federal Defendants from permit-

ting or acquiescing in the development of tribal coal underlying the Subject Lands and the Reserved and Restored Coal in the absence of tribal consent.

(f) That the Federal Defendants have breached their fiduciary trust duty, statutory duties and constitutional duties by acquiescing in the commercial development of tribal coal underlying the Subject Lands and the Reserved and Restored Coal without tribal consent.

(g) That Defendant Amoco Production Company, the Defendant Oil and Gas Lessors, the Defendant Oil Companies and the Defendant class members are subject to the provisions of the tribal severance tax set forth in Tribal Ordinance No. 89-01 and pre-existing tribal severance tax ordinances with respect to the severance, saving and removal of coalbed methane from the Subject Lands and from Reserved and Restored Coal located within the boundaries of the Southern Ute Indian Reservation where those Defendants have engaged or continue to engage in extraction of coalbed methane.

2. An Order quieting title in behalf of the Tribe to the beneficial interest in the coal, to all substances located within coalbeds or strata, and to all substances which are contituent, inherent, and integral components of the coal underlying the Subject Lands.

3. An Order quieting title in behalf of the Tribe to the beneficial interest in all Reserved and Restored Coal, to all substances located within coalbeds or strata of the Reserved and Restored Coal, and to all substances which are constituent, inherent and integral components of the Reserved and Restored Coal.

4. An injunction against the Secretary of the Interior and the other Federal Defendants prohibiting the Federal Defendants from permitting or acquiescing in the extraction of any substances from coal underlying the Subject

Lands and from Reserved and Restored Coal owned by the Tribe within the Southern Ute Indian Reservation in the absence of tribal consent thereto.

5. An injunction against Defendant Amoco Production Company and the Defendant Oil and Gas Lessors prohibiting them from extracting any substances from the coalbeds or strata, including coalbed methane and other coal constituents, underlying the Subject Lands.

6. An injunction prohibiting all Defendants, other than the Federal Defendants, from extracting any coal related substances, including coalbed methane and water, from Reserved and Restored Coal owned by the Tribe within the Southern Ute Indian Reservation in the absence of tribal consent thereto.

7. An award of damages to the Tribe from Defendant Amoco Production Company and from the Defendant Oil and Gas Lessors for the value of all substances wrongfully extracted from the Tribe's coalbeds or strata underlying the Subject Lands without deduction for the costs of labor, extraction, lifting, processing or marketing.

8. An award of damages from Defendant Amoco Production Company and from the Oil and Gas Lessors sufficient to compensate the Tribe for injury to the coal resulting from structural and volumetric alterations in the tribal coals underlying the Subject Lands, and an award of damages from said Defendants to the Tribe for reduction in value of the Tribe's coal for purposes of mining resulting from the conduct of said Defendants with respect to the Subject Lands.

9. An award of damages against Defendant Amoco Production Company and each of the Defendant Oil Companies equal to each such Defendant's share of delinquent taxes, penalties and interest imposed by Tribal Ordinance No. 89-01 and pre-existing tribal severance tax ordinances, related to each such Defendant's extraction of coalbed

methane from coal underlying the Subject Lands and from Reserved and Restored Coal owned by the Tribe.

10. An Order granting to the Tribe ownership of all facilities owned by Defendant Amoco Production Company or by any of the Defendant Oil Companies located on the Subject Lands or on other lands within the Southern Utel Indian Reservation installed for the purpose of extracting coalbed methane and water or the disposal of the same, which facilities, if removed, would interrupt or preclude tribal production of said substances.

11. An award of damages to the Tribe from Defendant Amoco Production Company, the Defendant Oil Companies and the Defendant class members for the value of all substances extracted by each of them from the Tribe's Reserved and Restored Coal, including coalbed methane and other coal constituents, without deduction for the costs of labor, extraction, lifting, processing or marketing where appropriate.

12. An award of damages from Defendant Amoco Production Company, the Defendant Oil Companies, and the Defendant class members sufficient to compensate the Tribe for injury that each of them may have caused to the Tribe's Reserved and Restored Coal resulting from structural and volumetric alterations in the Tribe's Reserved and Restored Coal, and an award of damages from said Defendants to the Tribe for reduction in value of the Tribe's Reserved and Restored Coal for purposes of mining resulting from the conduct of each of said Defendants.

13. An award of damages from Defendant Amoco Production Company and the Defendant Oil Companies for redress of injuries sustained by the Tribe resulting from the actions taken by said Defendants under color of state law.

14. An award of the Plaintiff's costs, attorneys' fees and such other relief as may be reasonable and just.

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STATE OF UTAH)
) ss.
COUNTY OF SUMMIT)

AFFIDAVIT

Matthew J. Mavor, being duly sworn, deposes and says:

1. I am a petroleum engineer with a Bachelor of Science and a Master of Science degree from Stanford University. I have been active for many years in studying recovery of gas from coal seams, developing and applying technology to enhance recovery, and developing models for reservoir analysis of coal seams. I have authored more than 30 papers and reports in this area. My Curriculum Vitae is attached as Exhibit A.

2. I have been engaged by counsel for Amoco Production Company as a consultant in connection with *Southern Ute Indian Tribe v. Amoco Production Company*, Civil Action No. 91-B-2273, United States District Court for the District of Colorado, and have submitted a report and have been deposed in that action. A copy of my report is attached as Exhibit B, and I adopt and make that report a part of this affidavit.

3. Among other things, I have reviewed the portions of the brief submitted by the plaintiff in connection with summary judgment motion, the affidavits of Messrs. Bend, Cooper, Creel, Levine and Marsh furnished with that brief, and the reports previously furnished by them to Amoco's counsel. I am making this affidavit in partial response to some of the matters and issues raised in those materials.

4. The approach to analyzing reservoirs and recovering natural gas from coalbeds is the same as that for nautral gas located in other types of reservoirs, such as sandstone, etc. In broad terms, it consists of locating and determining the extent of gas deposits, drilling into such

deposits, completing the gas well with techniques chosen in light of the bottom hole conditions, transporting the gas to the surface, storing the gas as necessary, and transporting it to the buyer or end user through natural gas pipelines. In every sense of the term, coalbed gas is simply one type of natural gas, recovered through the use of standard techniques, or adaptations of standard techniques, widely used for gas recovery worldwide.

5. Any gas reservoir is analyzed for commercial use by making as informed a prediction as possible of the quantity of gas recoverable for commercial use or sale. This analysis is made by measuring the reservoir's physical characteristics including the nature of the reservoir rock, the porosity, the permeability, the pressure at depth, the presence or absence of water, and the manner of flow. These parameters are then put into appropriate models, the values varied in accordance with the data, and a final determination made as to the volume in place and the recoverable volume of the reservoir and therefore of its value as an economic resource. As more information becomes available—such as the variability of the several parameters over distance and/or time—the model is refined, and predictions modified as needed.

6. Coal reservoirs are no different. To be sure, the numeric input is different from other types of reservoirs because permeability, for example, of coal can be lower or higher than sandstone or limestone. However, all reservoirs differ one from the other, in this sense. The treatment of the reservoir as a *gas* reservoir, is the same for coal as the containing rock as it is for any other rock.

7. The other elements of coalbed gas recovery likewise derive from standard natural gas recovery techniques. (a) the drilling equipment and technique are standard; (b) the completion of a coalbed well draws from the large number of completion techniques developed over the years

to handle the widely varying conditions found underground in non-coal gas reservoirs (for example, a currently popular completion technique, open hole cavitation, is a modern variation of simple, early techniques where a hole was drilled and fractures were induced in a disturbed region around the drill hole to allow more gas to be produced); (c) the transference of water to the surface is done by conventional pumping, with equipment regularly used on liquid producing oil and gas wells of all kinds; and (d) surface equipment, including water-gas separators, storage tanks, compressors and pipelines are all virtually identical to that used with the production of oil, water and natural gas from other sources. Coalbed gas when produced is commingled in pipelines with other gas and in its end use is indistinguishable from natural gas from other sources.

8. These general principles are explained more fully in the report attached as Exhibit B.

9. The test for "volatile matter" carried out on coal samples is one of those used to determine the rank of coal. The test conditions are reflected in ASTM D-3175, a copy of which is attached as Exhibit C. It is not, and cannot be used as, a test for coalbed gas, but one for measuring the combustible by-products of coal when the coal is broken down chemically. The percentage of volatile material in a coal sample is not an indicator of how much coalbed gas that coal in situ would contain.

10. The heating content, measured in BTU's, attributable to coalbed gas in coal in situ is very small; and the heating content attributable to coalbed gas in coal that has been mined and exposed for some time is usually zero or close to zero.

11. The coalbed gas content of coal reservoirs varies widely, in the United States and throughout the world. There are many coal deposits which have virtually no coalbed gas.

Dated this 5 day of November, 1993.

/s/ Matthew J. Mavor
MATTHEW J. MAVOR

[Notary Omitted]

OVERVIEW OF COAL GAS RESERVOIR STRUCTURE, FLUID DYNAMICS, AND COMPLETION TECHNOLOGY

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Summary

The purpose of this report is to summarize opinions of Mr. Matthew J. Mavor, Manager, Energy Services, Resource Enterprises, Inc., and technical matters relating to these opinions concerning the flow of natural gas through coal natural gas reservoirs, the completion of fluid production wells in coal natural gas reservoirs, and the effect of natural gas production from coal gas reservoirs upon the mineability of the coal solid material. The opinions and supporting material will be presented in three corresponding sections.

A review of the current model that is used to understand fluid flow through a coal gas reservoir will be presented in the first section entitled "Overview of Coal Natural Gas Reservoir Flow Behavior." This section includes material that will show that coal gas reservoirs are similar to other natural gas reservoirs and follow the laws of physics that control movement of fluid through porous media, and that the gas contained therein is not part of the rock (coal or non-coal) structure. In other words, natural gas found in coal gas reservoirs should not be considered differently than natural gas found in other types of gas reservoirs.

The most recent completion practices that are in use to produce gas from vertical production wells completed in coal gas reservoirs will be discussed in the second section entitled "Coal Gas Reservoir Completion Techniques." The subsurface equipment is the same as that used to complete wells in other natural gas reservoirs. The surface equipment is the same as that used to control and measure production from other vapor and liquid producing reservoirs. The most oft used completion procedure known as the cased hole, hydraulic fracture completion is very similar to, if not identical to, the procedure used to complete gas wells in other rock types. The most successful completion procedure used in certain San Juan Basin, Fruitland Formation coal gas production wells is known as the open-hole cavity completion.

The final section of this report entitled "Affect of Gas Production Upon Coal Mining Operations" will discuss the fact that gas must be produced from certain coal seams to be mined to reduce the danger of explosions. Many of these seams could not be mined without gas removal prior to and during mining. Production of gas has a positive and not an adverse affect upon the mineability of the coal.

Overview of Coal Natural Gas Reservoir Flow Behavior

Movement of fluids through underground fluid reservoirs containing hydrocarbons and water is governed by basic principles of physics concerning flow through porous media. The most significant properties of these reservoirs are the ability of the rock to contain fluids and the ability of the rock to allow passage of fluids to producing wells.[1] This section will discuss the flow behavior of underground fluid reservoirs in general and with specific regard to those reservoirs that include the rock type generally known as coal. This section will begin with general definitions followed by a discussion of the storage and fluid flow mechanisms. The final discussion will provide examples of production of fluids from natural gas wells completed in San Juan Basin, Fruitland Formation, coal gas reservoirs.

General Definition of Terms

To clarify the following discussion several definitions are required. Natural gas is defined as hydrocarbons or mixtures of hydrocarbons and non-hydrocarbon compounds that exist as a free vapor phase at temperature and pressure conditions of 80°F and 14.698 psia. The fluid properties of natural gas at reservoir conditions will depend upon the storage mechanism as well as the temperature and/or pressure conditions in the reservoir. Hydrocarbon liquids are hydrocarbons or mixtures of hydrocarbons and non-hydrocarbon compounds that exist in the liquid phase at temperature and pressure conditions of 80°F and 14.698 psia. Water is the pure compound H_2O. Water

may contain various concentrations of dissolved minerals and hydrocarbons that may be in the solid, liquid, or vapor form upon release from the water.

An underground hydrocarbon reservoir is a three dimensional rock system that contains natural gas, hydrocarbon liquids, and water. All hydrocarbon reservoirs contain water to some degree. The proportion of hydrocarbons in the liquid and vapor forms varies from one extreme to the other. The accumulation of hydrocarbons in the reservoir requires that there was a source of organic material in sufficient volume that was exposed to sufficient thermal maturation to generate hydrocarbons (commonly referred to as source rock) and a trap to prevent hydrocarbons from migrating out of the reservoir by the time that the reservoir was discovered. The location of the original organic material may or may not be within the current confines of the reservoir.

All reservoir rocks contain porosity. Porosity is the portion of the reservoir that is comprised of void space that has the ability to store fluids. Porosity is most commonly defined as the ratio of the void volume to the total bulk volume of the reservoir. The size of the pore spaces varies dramatically from micropores that are less than 2 nm (1 nanometer $= 10^{-9}$ meters) that are on the order of the size of gas molecules to centimeters. The distribution of the pore sizes in a reservoir is not uniform but varies dramatically from the very small pores in the coal and clay to natural fractures (discontinuities in the rock fabric) and vugs (voids formed by dissolution of rock material).

Reservoir rock has properties that permit the passage of fluids. Movement of the stored fluids requires that the fluids can flow through the reservoir as the result of pressure or concentration gradients. Flow occurs from regions of greater pressure or concentration to regions of lesser pressure or concentration. A single reservoir system is one that is hydraulically connected. Hydraulically connected means that fluid can be transported from one re-

gion to another within the reservoir or that fluid contained in a region of a reservoir affects the pressure or concentration behavior of the other regions of the reservoir during the producing life of the reservoir. The producing life of the reservoir is measured in tens of years. A single reservoir system can include multiple hydrocarbon pools interconnected through an aquifer (water reservoir).[2] Multiple reservoirs are often found in close vertical and areal proximity.

A reservoir is not a static system over geologic time periods of thousands or millions or years. The properties of the rock and any fluids contained therein are constantly changing over this time scale. The rate of change is sufficiently slow that the system often appears to be static during a time period of 100 years or less.

Hydrocarbon Source Rock and Migration

Natural gas reservoirs associated with coal deposits can consist of rock regions consisting primarily of coal material as well as rock regions consisting of predominately other types of non-organic rock material. The primary source rock for the natural gas and liquid hydrocarbons is generally believed to be organic material that through the process of thermal maturation has been converted to coal, hydrocarbons, and non-hydrocarbon materials.[3] The specific organic material that generated the hydrocarbons stored in a specific reservoir has been altered from the original form and may or may not have been located within the current confines of the specific reservoir of interest. As the organic material is generally believed to have the capacity to generate a significantly greater volume of hydrocarbons than can be retained by the organic material,[4] migration of hydrocarbons away from the original organic material must have occurred. Organic material contained within the non-coal regions would also have generated hydrocarbons. It is rarely possible with current technology to identify the precise origin of natural gas in a coal gas

reservoir. The source could have been within the reservoir of interest, from adjacent reservoirs, or from areas far removed from the current location of the reservoir. Note that the current location of the reservoir may not be the location of the reservoir when the hydrocarbons migrated into the reservoir.

The close proximity of reservoir rock and source rock where it occurs is not unique to coal natural gas reservoirs. The Monterey formation of California is one example of such a system that contains both source and reservoir rock.[5, 6]

Fluid flow through porous media can occur due to pressure and/or concentration differences. This is true during the producing life of a reservoir as well as during the geologic time since the hydrocarbons contained in the reservoir were created. A seal or significant restriction to flow must exist for a reservoir to exist today with hydrocarbon volumes in place that can be recovered in commercial quantities. The seal may not be totally impervious to flow as given sufficient geologic time all contained hydrocarbons may migrate from the current location. The producing life of a reservoir is no more than a "snapshot" in geologic time of the rock that makes up the reservoir and the fluids contained therein.

Consider the following example of the potential for migration. The organic material that was transformed into the coal contained within the Fruitland Formation of the San Juan Basin was deposited approximately 73 million years ago. The generated hydrocarbons have had sufficient time to migrate significant distances during the time since creation. The flow velocity of gas through a very low permeability (10^{-5} md) rock due to a small (0.01 atmosphere per meter) pressure difference is 2 cm per year. This is equivalent to a velocity of 200 km per 10 million years. Diffusion distances can also be significant. A mass transfer rate corresponding to a particle velocity of 0.12 cm/year can be estimated for a coal with a diffusion coeffi-

cient of 10^{-7} cm^2/sec. This is equivalent to a velocity of 12 km per 10 million years.

Reservoir Rock Regions, Subsystems, and Storage of Fluids

As mentioned earlier, natural gas reservoirs associated with coal deposits can consist of rock regions consisting primarily of coal material and stored fluids as well as rock regions consisting of predominately other types of non-organic rock material and stored fluids. A rock region is generally one that is believed to have rock properties that vary in similar manners to changes in pressure or fluid saturations. Absolute permeability, porosity, and pressure can vary within a reservoir rock region. The fluids contained within a reservoir rock region usually have similar compositions and have the same phase behavior as a function of pressure for non-compositional change cases.

The coal rock region is considered to consist of two macroscopically distinct sub-systems. The coal primary subsystem contains the majority of the volume of fluid in place and is considered to be the coal material that contains microscopic porosity in which fluids are contained. The coal secondary subsystem is considered to consist of an interconnected void volume with dimensions that are significantly larger than the microscopic pores contained within the coal material. The secondary system porosity is considered to be composed predominately of natural fractures and connected macropores.[7, 8]

Non-coal rock regions also can be separated into two subsystems. The non-coal primary subsystem contains the bulk of the stored fluid volume. The secondary subsystem consists of interconnected natural fractures and large scale pores.

Fluid is stored in the primary subsystem of the coal and non-coal rock types in the same manner. Both subsystems contain water, natural gas and hydrocarbon liquids stored

in the sorbed state and the free fluid state. Natural gas and hydrocarbon liquids can also be stored in the dissolved state in the primary subsystem. These states will be discussed shortly. The difference between the two rock types is that the sorbed state dominates the majority of the volume of fluid stored in the coal primary subsystem while the free fluid state dominates the majority of the fluid volume stored in the non-coal rock primary subsystem.

Domination of the volume of fluid stored by sorption is not unique to coal gas reservoirs. Natural gas producing Devonian Shale reservoirs also have large volumes of natural gas stored by sorption.[9]

Sorbed gas content estimates have been obtained for coal during Gas Research Institute sponsored studies performed in wells completed in coal gas reservoirs underlying the Southern Ute Indian Reservation. The gas content estimates have ranged from 626.1,[10] 706,[11] to 803 SCF/Ton [12] on a dry, mineral-matter-free coal basis. At in-situ conditions, the gas content estimates ranged from 388,[10] to 554,[11] to 583[12] SCF/Ton (standard cubic feet per ton).

Hydrocarbon gases and liquids can be dissolved in water that is in the free fluid state. Pure water can dissolve approximately 10 SCF/STB (standard cubic feet per stock tank barrel) of methane at conditions of 120°F and 1,422 psia.[13] These conditions are approximately those found in the coal reservoirs underlying the Southern Ute Indian Reservation. The volume of gas sorbed in the coal primary subsystem is much greater than the volume of gas stored in the dissolved state in water in the free fluid state.

Reservoir Fuid Flow

Flow through the reservoir can occur between all rock regions. Molecules will move between regions as the result of a difference in pressure and/or concentration for those in the free fluid state and as the result of a difference in

concentration for those in the sorbed state. Flow behavior is quantified at the macroscopic scale.

Flow of the fluids in the free fluid state is described by Darcy's Law. Darcy's Law states that the magnitude of the fluid mass flow rate is proportional to the surface area through which flow occurs, the permeability, and the pressure gradient.[1] Net molecular movement occurs in the direction of decreasing pressure.

Flow of fluids in the sorbed state is described by Fick's Law[8, 14] that states that the magnitude of the fluid mass transfer rate is proportional to the surface area through which flow occurs, the diffusion coefficient, and the concentration gradient. Net molecular movement occurs in the direction of decreasing concentration.

Both permeability and diffusion coefficient are constants of proportionality and are arbitrarily defined. Permeability is determined for rock samples in the laboratory by measuring fluid mass flow rates as a function of pressure differences across a sample. The primary unit for permeability is the Darcy. Diffusion coefficient is determined by measuring fluid mass flow rates as a function of concentration differences across a sample. The primary unit for the diffusion coefficient is cm^2/sec. Both experiments assume that the contribution to mass transfer from other mechanisms is negligible.

Both permeability and diffusion coefficient appear to be influenced by a variety of parameters. Permeability is a function of the stress applied to the rock, interactions between fluids and the rock material, and the relative proportion of fluids in the vapor and liquid states to name a few parameters. Diffusion coefficient can be a function of temperature, interactions between the fluid molecules and the rock material, and the relative concentration of molecular types to name a few parameters.

Fluids can be produced from a reservoir by reducing the pressure at locations within the reservoir. The petroleum industry drills wells to allow access to the reservoir. The fluid pressure and/or concentration is reduced in the well that in turn creates a pressure and/or concentration gradient within the reservoir.

Natural Fracture Systems

Fluid flow from the coal primary subsystem to production wells requires that a well developed natural fracture system be present in the secondary subsystem. Natural fractures can be observed in coal gas reservoirs from the microscopc to the macroscopic scale. Natural fractures in coal are termed "cleats." The fracture void volume comprises 3% or less of the reservoir bulk volume and stores the majority of the water that is produced from the coal reservoir system. This section provides a brief overview of the geometry of the fracture systems.

A fracture is defined as any natural break or discontinuity in a rock caused by stresses exceeding the strength of that rock, along which there has been virtually imperceptible movement.[18] The physics controlling the creation of natural fractures in coal and other rocks are similar. Coal natural fracture systems are commonly classified into fractures of four types: face cleats, butt cleats, tertiary cleats, and joints. The geometry of cleats is usually specified in terms of frequency (number per centimeter), orientation in the areal sense, dip or the orientaton in a vertical sense, and aperture width.

Face and butt cleats are the most common fractures observed in the Fruitland Formation coal gas reservoirs. Face and butt cleat systems are commonly orthogonal or nearly orthogonal to each other and are essentially perpendicular or near-perpendicular to bedding surfaces. The orientation of the face cleats in the interior of the basin varies but is commonly to the northeast.[12] Shorter length butt cleats terminate in longer length face cleats and are

generally assumed to be of lesser permeability. The dip of the face and butt cleats is nearly vertical in coal beds that are flat lying.

Face and butt cleat fracture description data collected from samples obtained from several Fruitland Formation coal gas wells[16] indicates that the majority of the dip angles are between 70 and 90 degrees. Cleat height ranges from 1 to 60 cm. Cleat frequency in vitrain lithotypes ranges between 1 and 49 cleats per cm. The aperture of the cleats ranges between 0.01 and 0.3 mm with the majority less than 0.05 cm. The aperture widths are quite narrow and can be a significant function of the stress applied to the coal core samples.[17] The porosity of the natural fracture system (fraction of void space in the fracture to the total bulk volume of the reservoir) is on the order of 0.1 to 3%.

As a result of geometric and lateral continuity relationships, there is commonly a significant face and butt cleat permeability anisotropy in coal reservoirs. The ratio between absolute permeability in the fact and butt cleat orientations has been estimated to be 2.8 at the GRI research location known as the COAL Site.[12] The orientation and development of the natural fracture systems strongly influences the directions of fluid flow in the reservoir.

Face and butt cleat frequency is a function of the coal lithotype and the thickness of each of the lithotypes. A coal lithotype is a macroscopically visible band in humic coals[18] that is composed of relatively constant maceral composition. A coal maceral is one of the organic constituents that comprise coal.[18] Macerals in coal are analogous to minerals in non-coal rocks such as sandstone. As an example, a vitrain lithotype is composed predominantly of the maceral vitrinite. Vitrain will appear as a shiny black band in a coal core sample as illustrated in Figure 1. Fracture frequency is typically greatest in the vitrain lithotype. Another very common lithotype is

clarain that is composed of vitrinite and a greater volume of mineral matter than the vitrain lithotype. Clarain appears to be more dull than vitrain in coal core samples. Clarain tends to be less fractured than vitrain. The fracture frequency generally increases as the thickness of the lithotype decreases.[16, 18]

The Fruitland Formation coal zones are characterized by a significant degree of interbedding of coal and non-coal material. An excellent illustration of the degree of similar interbedding from the Raton Basin of Colorado is illustrated in Figure 2. The staff in the figure is five feet long. In a continuous coal zone defined as an interval in which the density log response does not exceed 1.75 g/cc, approximately 30 to 35% of the contained material is in the form of shale layers that separate relatively clean coal layers. Figure 3 illustrates a density log measured in the Southern Ute-Mobil 38-1 well located in Section 38, Township 34 North, Range 10 West of La Plata County, Colorado, on the Southern Ute Indian Reservation.[20] The interbedding of coal and non-coal material reduces the overall thickness of the continuous coal intervals that are in turn comprised of discrete interbedded lithotypes. Fracture frequency has been observed to increase as a function of the decrease in continuous coal zone thickness caused by coal—non coal interbedding. In fact, REI researchers have concluded that a highly interbedded coal gas reservoir will tend to have greater fracture development and as a result greater absolute permeability than a continuous coal interval with less interbedding with non-coal material.[16] As a result of the vertical interbedding, the absolute permeability in the vertical direction can be quite low. The interbedded shale is composed predominately of clay that have very low absolute permeability.

Additional facture systems are present in Fruitland coals that are on the scale of the face and butt cleat system sizes. These fractures are termed tertiary fractures and

are distinguishable by orientations that are different from those of the face and butt cleats. The tertiary fractures commonly terminate in the face or butt cleats suggesting that they were formed later in time. The presence of these cleats is significant as they result in a greater degree of connectivity between the face and butt cleats. The increase in connectivity increases the overall permeability of the natural fracture system.

Larger scale fractures referred to as joints with inter-fracture spacing on the orders of meters are also present in the Fruitland Formation coal. The joints tend to have greater heights and can cut across lithotype and coal-non-coal interbeds. As for the tertiary fractures, the joints increase the overall connectivity of the fracture system resulting in increased fracture system permeability. The larger scale joints also increase the permeability in the vertical direction.

Evidence of the joint systems has been obtained from sonar logs measured in wells that were completed with open-hole techniques that resulted in a cavity in the coal zones. Figure 4 illustrates a cross sectional view of the cavity in the Southern Ute 10-3, 32-10 well located in Section 10, Township 32 North, Range 10 West, La Plata County, Colorado.[21] The large flat surfaces with a length of three to five feet are believed to be the result of failure of the coal along a joint surface.

The complex distribution of fractures results in a highly heterogeneous system. Interestingly, for reservoir engineering purposes, the degree of heterogenalty is such that the flow behavior can act as though the permeability is uniformly distributed in many cases. This observation has been supported by the interpretation of transient pressure tests conducted in the Fruitland Formation coal intervals during GRI sponsored research efforts.[22]

An Example of Simple Coal Gas Reservoir Fluid Flow

Consider a simple coal natural gas reservoir that consists of the primary and secondary subsystems. At virgin conditions the coal gas reservoir contains water in both the primary and secondary subsystems. The majority of the water that can be produced is stored in the secondary subsystem in the free fluid state. The reservoir also contains gas that the majority of which is stored in the sorbed state in the primary subsystem. Gas is also contained in the secondary subsystem in the free fluid state and dissolved in the water.

Imagine that a well is drilled with water. In many cases, the hydrostatic head due to the water in the well would cause the well pressure to be the same as the pressure in the coal gas reservoir at the same depth. There is a natural gas concentration gradient between the rock and the well regardless of the pressure level. Non-water molecules begin to flow by diffusion into the well through both the primary and secondary subsystems. When water is removed from the well, a reduction in the pressure adjacent to the reservoir occurs that in turn causes a pressure gradient through both the primary and secondary subsystems. Flow of water and gas occurs through both subsystems to the well.

In commercially exploitable coal gas reservoirs, the majority of the mass flow rate into the well is due to the pressure gradient through the secondary subsystem. The permeability of the primary subsystem is on the order of micro- and nano-darcies while that of the secondary subsystem is on the order of millidarcies. Secondary subsystem Darcy flow rates are 1,000 to 1,000,000 times greater than primary subsystem Darcy flow rates. In addition, the mass transfer rate at the well due to the pressure gradient far exceeds the mass transfer rate due to the concentration gradient.

The pressure is reduced in the secondary subsystem as fluid is produced. Both pressure and concentration gradients then exist between the primary and secondary sub-

systems. The mass transfer rate into the secondary system is high in commercially exploitable reservoirs due to the large surface area of the primary-secondary subsystem interface.

As production of water continues, the gas saturation in the secondary sub-system increases. The gas saturation is defined as the volume of gas in the secondary subsystem porosity divided by the volume of the secondary subsystem porosity At first all flow into the well is water that is originating from the water filled secondary subsystem that has a porosity of less than 3% of the total reservoir volume. As time continues, the gas flow rate will increase as the primary subsystem delivers gas to the secondary subsystem and the gas saturation in the secondary subsystem increases. The ability of the secondary system to permit the passage of gas is proportional to the gas saturation in the secondary system. This ability is quantified with a relationship to fluid saturations known as relative permeability.[23] As the gas saturation increases, the flow rate of gas increases if all else remains the same. The ability to permit the passage of water decreases as the gas saturation increases. Finally, the water production rate will remain at a relatively low level and gas production rates will begin to decline as the volume of gas stored in the primary subsystem and the pressure of the secondary subsystem is depleted.

The scenario discussed above is the classic description of coal natural gas reservoir behavior. This behavior is generally observed for newly drilled wells located in newly exploited reservoirs away from existing producing wells. The secondary system must be devoid of gas for this scenario to occur. If the secondary system contains significant volumes of gas, the gas rate can be high initially and decline as production continues. An example of this will be described in the next section for wells drilled into developed reservoirs. Coal gas wells have been observed not to exhibit the classic behavior in the high volatile B bituminous area of the Fruitland Formation. The classic

scenario also assumes that the well is produced at a relatively constant bottom-hole pressure. When the bottom-hole production pressure varies, both gas and water production rates will vary dramatically.

One of the common misconceptions concerning gas production from coal reservoirs is that most wells will initially produce all water and the proportion of gas production will increase as a function of time early in the life of the well. The increase in gas production is often referred to as a "negative decline." This phenomena is strictly due to relative permeability changes to gas and water as gas and water saturations change in the secondary subsystem. The "negative decline" term results from a comparison to gas wells completed in reservoirs with immobile water saturations. Water can be immobile if the water saturation is sufficiently low (but never zero) so that the water is trapped in the reservoir by capillary forces. In this case, if a gas well is placed on production while constantly maintaining the bottom-hole producing pressure at the same level, the gas rates will decline as a function of time. The decline is due to the reduction of the average reservoir pressure as the volume of gas in place is depleted. This scenario is possible for gas wells completed in coal gas reservoirs and non-coal gas reservoirs.

The presence or lack of a negative decline period does not prove or disprove that the source of gas produced by a well is from gas sorbed in the coal primary subsystem. Nor does water production or the lack thereof uniquely specify the type of reservoir contributing to the production. Gas reservoirs completed in no-coal rock types always contain water and are located adjacent to rocks that are saturated with water. The water production rate can decrease or increase as a function of time depending upon the initial gas saturation in the reservoir pore space and upon the degree of water influx from surrounding aquifers.

The phenomena of increasing gas production as a function of time is not unique to coal gas reservoirs. Increasing

gas production can also be observed in reservoirs that produce water, liquid hydrocarbons, and natural gas. Reservoir systems of this type are known as "black oil" reservoir systems. In black oil systems, the gas is dissolved in the oil at the time of initial production and not in the free fluid state. The initial production is predominately oil and solution gas with or without water. As the reservoir pressure is reduced, gas is released from the oil and increases the gas saturation in the pore space. As the gas saturation increases, the gas production rate at the well increases with a corresponding decrease in the oil production rate.[24] This phenomena is so analogous to the coal natural gas reservior phenomena that reservoir simulators designed to model the production behavior of black oil reservoirs can be used to accurately model the production behavior of coal natural gas reservoirs.[25]

Examples of Fruitland Formation Coal Gas Wall Productivity

This section will present two actual examples of Fruitland Formation coal gas well production rates that were studied in detail during the course of GRI sponsored research efforts. The first example is from the Southern Ute Tribal I PLA 9 #2 well that was completed with open-hole cavity techniques at the GRI COAL Site.[12] The second well is the Northeast Blanco Unit (NEBU) #403R well located in Section 9 of Township 30 North, Range 7 West of Rio Arriba County, New Mexico.[26] This well was also completed with open hole cavity technology. These type of completions will be discussed in the following section.

The COAL Site included efforts performed on one producing cavity well and two observation wells. The Site was located in Section 17 of Township 32 North, Range 10 West of La Plata County, southwestern Colorado as illustrated in Figure 5. The primary well was a newly drilled open hole cavity well, Southern Ute Tribal I PLA 9 #2 (I #2). This well was logged and tested before

and after installing the cavity completion. A newly drilled pressure observation well (GRI #1) was located 178 feet to the northwest of the I #2 well in the orientation of the butt cleats of the natural fracture system of the coal reservoir. A second newly drilled observation well (GRI #2) was located 1,069 feet to the southwest of the I #2 well in the orientation of the face cleats.

Single well tests of each of the three wells were performed to evaluate the natural fracture system (secondary subsystem) properties prior to cavitation. A pre-cavitation interference test was performed by producting the I #2 well and measuring the pressure response at the GRI #1 and GRI #2 locations. The interference test was repeated after cavitation to evaluate changes that may have occurred due to the completion process and additional production.

The post-cavitation gas and water production rates are illustrated in Figure 6. These rates were measured with a permanently installed production test separator located near the wellhead. Artificial lift was not required to achieve these production rates as the reservoir contained sufficient pressure and permeability to produce naturally. Time zero in this figure is the time at which the cavitation completion operations were initiated. Two production periods are illustrated. The first production periods began at approximately 560 hours and ended at approximately 690 hours. Gas rates increased from 600 MSCF/D (thousand standard cubic feet of gas per day) to a maximum of 1,200 MSCF/D. Water rates decreased from 1,000 STB/D (stock tank barrels per day) to 850 STB/D. The well was shut-in between 695 and 785 hours due to shut-in of the gas sales pipeline. The second production period began 785 hours and continued to 1,485 hours at which time the well was again shut-in. Gas rates increased from 800 MSCF/D at the beginning of the second production period and peaked at 1,600 MSCF/D at approximately 1,000 hours. Following the peak, the gas

rates declined to 1,250 MSCF/D at the end of the production period. Water rates declined from a high of 800 STB/D at the start of the second production period to a relatively stable rate of 450 STB/D at the end of the period.

At first glance, one might be inclined to conclude that the observed increasing gas production rate followed by a decline is due to "classic" coal natural gas reservoir behavior that would be the result of changes in fluid saturations and a decrease in the average reservoir pressure. This is an example where a cursory analysis can lead to considerable errors in the evaluation of producing well performance. Simulation of the well performance with both a coal natural gas reservoir simulator and a dual porosity black oil reservoir simulator was performed to evaluate the data. The observed production rate and bottom-hole pressure data was matched as closely as possible with the output of the numerical models to evaluate the reasons for the productivity variations.

The illustrated match in Figure 8 was obtained with reservoir description based upon the extensive core and well test analyses that were performed. The drainage area in the model was consistent with the 320 acre drainage area spacing of the wells in the surrounding area. The well performance was accurately matched at longer times. It was difficult to match the early production period data or the water production data at the start of the second production period.

The decrease in the gas production rates at longer times was not due to variations in fluid saturation or average reservoir pressure. In fact, the fluid saturations are relatively consistent during these time periods and the reservoir pressure had not been substantially reduced from the original pressure. The decrease in the gas rate was due to increased resistance to flow around the cavity that accounted for a 30% reduction in the near-cavity flow efficiency. The reduction in the near-cavity permeability appears to have been temporary or overcome by other mechanisms because one year after the test was performed the well was producing in excess of 3 MMSCF/D with a flowing bottom-hole pressure of 650 psia.

The second example is the NEBU #430R well that was an offset well to the NEBU #403 well studied extensively during 1988 as part of a GRI research project.[26] This well is completed in the Fruitland Formation with open hole cavity techniques. The well is capable of production without artificial lift due to the reservoir pressure and permeability of the reservoir.

Fgures 7 and 8 illustrate the measured gas and water production rates and those estimated with a coal natural gas reservoir simulator.[27] Note that this well does not follow the classic "negative decline" period model discussed above. Gas rates are continuously declining for this well with the exception in the large increase that occurred at approximately 70 hours. The increase in gas and water production rates that occurred at this time was due to a decrease in the flowing bottom-hole pressure from 1,250 to 950 psia. The drop in bottom-hole pressure was due to a decrease in the surface pipeline pressure. This behavior resulted as the gas saturation in the secondary subsystem was approximately 35% of the secondary subsystem total volume at the time that the well was placed upon production. The Northeast Blanco Unit Area is offset by numerous Meridian Oil Company coal gas reservoir wells that had been on production for several years prior to NEBU production.

There is no characteristic behavior in the production performance of this well that immediately suggests that the source of gas is from a coal natural gas reservoir. This is true of the production rates as well as the composition of the produced fluids.

One aspect of the reservoir simulation that is interesting for both of these examples is the lack of the need to account for the diffusion of gas through the coal matrix.

Diffusion of gas is so rapid in the high volatile A bituminous and greater rank area of the basin that the computed production performance is independent of the coal primary subsystem diffusion coefficient that is used in the model. The black oil model used to match the production behavior of the I #2 well assumed that the diffusion coefficient was infinite. this assumption resulted in the a computed average gas content of the coal primary subsystem that was always equal to the sorbed gas storage capacity at the secondary subsystem average pressure. Variations in the diffusion coefficient did not affect the computed behavior for the NEBU #403R well either.

Coal Gas Reservoir Completion Techniques

The preceding discussion has ignored the effect of the well upon productivity of the reservoir. Accurate prediction of productivity requires that the effect of the well-reservoir boundary be properly quantifled. Drilling and completing a well significantly alters the properties of both the primary and secondary subsystems adjacent to the well. Solid and liquid material from the drilling fluid are forced into the gas reservoir. The solid and fluid material interact with the reservoir fluids and rock. These interactions are almost always detrimental to the ability of the reservoir to produce fluids. Drilling mud commonly reduce the deliverability of the coal reservoir to less than half the virgin rock potential within hours of drilling.[12] Completion techniques are designed to overcome the effects of drilling and to increase the connectivity of the well to the reservoir rock through which flow occurs.

Natural gas producing wells completed in coal gas reservoirs have utilized a a variety of completion techniques including the following. With the exception of the cavitated open-hole techniques, all of the completion techniques were developed for non-coal gas reservoirs and are applied to coal gas reservoirs with very little modification from the originally developed technology.

Table 1. Completion Techniques

Barefoot Open-Hole
Under Reamed Open-Hole
Hydraulically Fractured Open-Hole
Cased, Slotted, No Stimulation
Cased, Perforated, No Stimulation
Cased, Perforated, Hydraulic Fracture Stimulation
Cavitated Open-Hole

The most widely used technique is the cased, perforated, fractured technology. In the San Juan Basin, the open-hole cavity completion is also extensively utilized and accounts for approximately 860 of 2,200 wells. This section briefly discusses these techniques.

Cased Hole, Hydraulic Fracture Completions

Numerous types of hydraulic fracture stimulation treatments have been applied in coal natural gas reservoirs. The following injection and proppant carrying fluids have been used. These fluids were developed for non-coal reservoir applications and have been applied to coal gas reservoirs with only minor modifications.

Table 2. Stimulation Fluids

Water
Hydrochloric Acid
Hydrofluoric/Hydrochloric Acid
Nitrogen Foam
Carbon Dioxide Foam
Nitrogen, Carbon Dioxide Foam
Linear Gelled Water
Cross-linked Gelled Water

Hydraulic fracturing technology has become a subject of much debate among coal gas reservoir operators. The techniques that have been in vogue have come full circle starting with water injection without proppant in the early days, progressing to linear gels, foamed water, cross-linked gel systems, nitrogen and carbon dioxide foamed systems,

and recently, back to formation water with low and no proppant concentrations.

Originally, open-hole completions (especially in the Warrior Basin) were stimulated by injection of water [28] without proppant to artificially fracture the near-well reduced permeability zone and to provide flow paths through the reduced permeability zone. These stimulations were reported to be successful.

Taurus Exploration, Inc., began using foamed water and linear gel systems in the Oak Grove Field of the Warrior Basin to stimulate the Mary Lee/Blue Creek coal seams in 1986.[29] Total proppant load was 40,000 pounds of 10/20 or 20/40 mesh sand for each type of treatment. Treating pressure gradients ranged from 0.77 to 1.21 psi/ft. Based upon this experience, high volume water treatments with moderate proppant levels (2 to 4 pounds of proppant per gallon of water) became the standard.

Use of cross-linked gel systems was found to be very successful at the GRI funded Rock Creek research site.[30] Proppant loads were increased to 10 pounds per gallon. Fluids of this type were used by Amoco Production Co. in the Cedar Hill Field of the San Juan Basin, New Mexico, as well. Other San Juan Basin operators shortly followed suit. A typical San Juan Basin stimulation used was based upon designs used in sandstone reservoirs and was similar to the following.

Table 3. Typical San Juan Basin Proppant and Fluid Schedule

Stage	Fluid Volume US Gallons	Proppant Concentration pounds/gallon	Proppant Size Mesh
1	20,000	0.0	—
2	2,000	1.0	40/70 or 100
3	3,000	2.0	40/70 or 100
4	27,000	2.0 to 10.0	12/20

The total weight of proppant used was typically 100,000 to 120,000 pounds. The 40/70 mesh sand or 100 mesh sand was added for fluid loss control. Injection rates of all stages were typically 50 to 60 barrels per minute. All injection was down the casing because of the high rates used. The cross-linked fluid used was generally 30 to 40 lbm of HPG (hydroxypropylguar) polymer per 1,000 gallons of fluid, cross-linked with a borate ion.[31] Treatments of this type typically require high injection pressure gradients exceeding 1.0 psi/ft when the coal seams are located within impermeable shale zones.[32] Treating pressures were observed to be less than the overburden gradient when the coal seams were located adjacent to the underlying Picture Cliffs Sandstone due to downward height growth into the sand. The resulting fracture geometry can be quite complex containing multiple vertical as well as horizontal components.[33] Warrior Basin cross-linked gel stimulations are similar.[34]

Open-Hole Cavity Completions

Meridian Oil Company in 1988[35] became the first San Juan Basin operator to widely use a completion technique that resulted in formation of a cavity in a coal gas reservoir. After production data for several new Meridian cavity wells became available in the public domain, many operators with Fruitland coal acreage in the San Juan Basin became interested in the cavity technique. Wells completed with cavities are often, but not always, outperforming adjacent wells completed by running and cementing casing followed by perforation and hydraulic fracture stimulation. The stimulation of cased wells has been required in an attempt to effectively connect the coal reservoir to the wellbore and to bypass damage to near-wellbore permeability.

The Fruitland gas well cavity completion technique has since been successfully applied by several operators in addition to Meridian in the high voltaile A bituminous

and greater rank area[36] of the northern San Juan Basin. Figure 10 illustrates the number of cavity completion attempts per township throughout the basin.[37] Approximately 870 cavity completion attempts had been performed as of September, 1991,[37] out of a total of roughly 2,200 wells.

As an example, Devon Energy Corporation has applied the cavity completion technology very successfully in the Northeast Blanco Unit that is located in San Juan and Rio Arriba counties of New Mexico.[36] Devon's original plans called for completing wells with cased, hydraulic fracture technology as well as with cavity techniques. Based upon the initial gas and water productivity of the cavity wells, the original ten cased, fractured wells were replaced with new wells completed with cavities.[39] These new wells were located with 300 feet of the original cased, fractured well locations. The initial gas production rates of the cavity completions reported while cavitating were approximately twenty-one times the initial gas production rates of the cased, fractured wells. The ratio between the stabilized cavity well gas production rates and the cased, fractured well initial rates was 6.7. This disparity in Fruitland coal well initial and long term gas production rates from the two completion types can be illustrated with other examples from the Cedar Hill, Meridian 400, and portions of the northern Ignacio Blanco Field, all of which are in the northern San Juan Basin.

Open-hole cavity wells are installed using a controlled blowout technique in the following approximate manner. The exact procedures differ due to the operator's preferences.

Table 4. General San Juan Basin Cavity Completion Procedure

Step	Description
1.	Drill to within several meters of the top of the coal interval of interest using a conventional rotary drilling rig.
2.	Cement production casing to surface. Release the drilling rig.
3.	Rig up a modified completion rig capable of controlling coal reservoir pressures with blow-out prevention equipment and drilling with a hydraulically operated power swivel.
4.	Drill through the coal seams and innerburden with water. Allow the well to flow while drilling and produce solid material, gas, and water to a flare pit.
5.	Pull the drill bit up into the casing. Pressure up the wellbore and near-well region with air and water. Allow the pressured well to blow out to a pit.
6.	Periodically drill back to the original total depth of the well while circulating solid material to surface. Continue circulation until the wellbore remains relatively free of solid material.
7.	Repeat the injection, blow out, clean out sequence until the cavity is stabilized. Stabilization is deemed to occur when production of solids is minimal or non-existent and when fluid production rates are not improved by continued cavitation.
8.	Install the tubing and well head equipment and move the completion rig off location.

Operators have been successful in re-working existing cased hydraulically fractured wells to convert to cavity completions. The most common method used in the remedial efforts is to abandon the perforated, fractured interval and to mill a window in the casing 100 to 200 feet above the Fruitland coal interval.[40] A whip stock is set in the

casing below the window and the well is side tracked through the coal interval. The side tracked hole is then cavitated in the same manner as the newly drilled wells. Bowen/Edwards & Associates have converted a cased well to a cavity completion by milling a window in the casing across the coal seams and then cavitating in the usual manner.[41]

GRI has funded two major research efforts to increase the understanding of the affect of the cavitation completion upon the coal gas reservoir production behavior. The first project was performed in cooperation with Amoco Production Co. at the COAL Site discussed earlier. The second project was performed with ARCO Oil & Gas Company at a location referred to as the Vertical COAL Site located in Section 10 of Township 32 North, Range 10 West, La Plata County, Colorado, approximately 3 miles from the COAL Site.[21]

The success of the cavitation process is believed due to the ability to effectively link the wellbore to the natural fracture system of both coal and non-coal lithologies. The ability is believed to be due to the rapidly repetitive injection-production cycles. The injection of air followed by the rapid expansion of the air upon production likely propagates along existing fractures and increases the natural conductivity by increasing the aperture width. The increased aperture width may be retained due to self propping by cleat surface micro-rugosity and support by authigenic mineralization along cleat walls.[42] While the near-well average permeability is increased, it is still the existing natural fracture permeability away from the well that controls the commercial productivity of the reservoir.

The cavity completion results in a very rugose wellbore condition. Figure 11 illutrates the COAL Site cavity geometry measured with a sonar log. The total volume of the cavity was approximately 2,700 cubic feet caused by removal of roughly 100 tons of coal. The average diameter

of the cavity was 8.6 feet with a maximum diameter of 10.8 feet.

The following table summarizes the conclusions reached by evaluation of data at the two research sites.

Table 6. Summary of GRI Cavity Completion Research Conclusions

Item	Conclusion
1.	The cavity completion effectively links the wellbore with the natural fracture system of the reservoir. The increased fluid productivity is primarily due to more effective linking than existed prior to cavitation.
2.	The cavity accounts for a 60% increase in the fluid productivity.
3.	Formation damage is minimized by the lack of contact between the coal reservoir rock and drilling fluids.
4.	At the COAL Site, the deliverability of gas and water to the well prior to cavitation was controlled by butt cleat conductivity.
5.	At the COAL Site, the deliverability of gas and water after cavitation is controlled by a conductivity equal to the face cleat conductivity.
6.	At the COAL Site, the absolute permeability controlling production temporarily increased during the cavitation operations. The long term productivity after 28 days of production was controlled by the original absolute permeability of the natural fracture system.
7.	Cavitation of the cavity well at the Vertical COAL Site did not improve the gas productivity since the uppermost coal seams were in effective communication with the well prior to cavitation.
8.	Additional research is required to optimize the cavitation process and increase the applicability to cased, hydraulically fractured wells without the need for milling windows in the existing casing.

Drilling Techniques and Completion Equipment

This section reviews the drilling techniques and completion equipment required to install and operate coal gas reservoir production wells. The technology is the same as that used to drill and operate wells in other reservoir types.

Originally, San Juan Basin Fruitland Formation coal gas wells were rotary drilled with mud and completed open hole with under reaming techniques.[36] Failure to maintain hole stability led operators to convert to conventional mud drilling technology after which casing was landed and cemented in place. Communication with the reservoir was achieved by jet perforation followed by hydraulic fracture stimulation. Recently, operators have turned to the open-hole cavitation techniques.

To maintain stability, conventional wells are drilled with rotary drilling rig[43] utilizing a fresh water and bentonite (gel) mud system with barite for density control. Drilling fluid density is controlled to achieve a mud hydrostatic head 0.1 to 0.5 psi/ft greater than the formation pressure gradient to reduce formation damage.

The size of the drilling rigs ranges from those capable of pulling single 30 foot joints of pipe to those capable of pulling three joints of pipe. The most common rig size is capable of pulling doubles. Location pads are several hundred feet square to accommodate the rig, air compression equipment, generators, mud pumps, the mud tank circulation system, and reserve/flare pits. Often the drilling pad of an existing well drilled to a deeper horizon is used to minimize location preparation costs.

Surface hole is drilled with a 12¼ inch bit to 250 feet at which depth surface casing is set. The common surface casing specifications are 8⅝ inch, 24 lbm/ft, J-55, cemented with Class B cement containing 2% CaCl. Wells are commonly drilled to total depth using a 7⅞ inch bit. The cased hole depth is generally 100 to 200 feet deeper

than the deepest coal so as to allow installation of a pump below the seams and to provide a sump for produced solid material. The most common production casing utilized is 5½ inch, 23 lbm/ft, K55. Cementing is accomplished by circulating cement spacer and 500 sacks of light weight cement followed by approximately 100 sacks of Class B cement. This type of cased hole well is generally completed by jet perforation and hydraulic fracture stimulation.

The techniques used to drill open cavity wells are somewhat different. A conventional rotary rig is used. The mud system generally consists of a fresh water, natural mud system. Small concentrations of polymer may be added for viscosity control. Larger bits and casing are utilized and casing is set above the uppermost Fruitland coal seam. The surface hole is drilled with a 12¼ inch bit. Surface casing size is commonly 9½ inch, 38 lbm/ft. The top set hole is drilled with a 8¾ inch bit. Production casing is commonly 7 inch, 23 lbm/ft, N-80. The casing is set above the coal seams and cemented with Class B cement. The coal and other rocks are then drilled with fresh water and completed open hole.

Tubing sizes generally vary from an outer diameter of 2⅜ inches to 5 inches. Packers are generally not installed in the wells. Flowing wells are allowed to produce up either the tubing or the tubing-casing annulus. Pumping wells have pumps installed in the tubing. Water is produced up the tubing while gas is allowed to produce up the tubing-casing annulus.

Artificial Lift

Artifiicial lift is very common in the petroleum industry to reduce the bottom hole production pressure for wells that produce liquids. A reduction in the bottom-hole pressure generally results in an increase in the fluid production

rates. A desire to reduce the bottom-hole pressure is the reason that some coal natural gas wells have artificial lift systems installed. Many Fruitland Formation coal gas wells produce gase and water without artificial lift.

The most common artificial lift system for coal natural gas production is a sucker rod insert pump although the progressive cavity pump has been in wide use for the relatively shallow reservoirs in the Warrior Basin. Gas lift systems are in use in the San Juan Basin generally to initially produce a high rate water producing well. Open hole cavity wells usually have no artificial lift installed although some operators have installed gas lift systems. Gas lift systems are usually not installed for long term use as it is not possible to decrease bottom-hole pressures to the levels possible with pump systems.

In pumped wells, gas is allowed to produce up the annulus while water and solids are pumped up the tubing that is usually 2⅞ or 2⅜ inches in diameter. Pump placement is often below the lowest perforation to minimize gas locked pump problems. Pump designs also incorporate anti-gas lock systems such as gas anchors. In high rate water wells, blast joints are placed across perforated intervals to reduce erosion induced tubing failures.

In the San Juan Basin, the most common system in use is a sucker rod system. Pump jack sizes include 180, 300, and 640 peak torque rating with 64 to 200 inch stroke lengths.[44] The prime movers for the pump jacks are often wellhead gas or propane fired unless electricity is available in the field. A Martin split ring type plunger pump placed in the tubing with undersized rings provides solids production tolerance required by coal fine material production. These type systems are capable of pumping 2,500 B/D although the most common size is in the 800 B/D range.

Surface Equipment

San Juan Basin surface equipment is designed to separate gas and water production and to handle minor amounts of solid material production. Identical equipment is used for production of natural gas and liquids from non-coal reservoirs.

The northern San Juan Basin reservoirs are over-hydrostatically pressured with surface shut-in pressures approaching 1,500 psig in some instances. The wellhead equipment is usually over-designed to a 3,000 psig working pressure. Although carbon dioxide production is quite significant with carbon dioxide mole fractions ranging from 1 to 15% in the produced gas stream, most operators have not used welhead equipment designed for carbon dioxide service due to the significant increase in cost.

San Juan Basin surface flow lines are typically 2 or 3 inch schedule 80 steel pipe. The pipe size is selected based upon the water volume to be produced and the distance to the separation facilities.

The common San Juan Basin separator is a standard horizontal or vertical production separator designed to either 1,000 or 1,440 psig working pressure. The separator is operated at the lowest possible pressure above the gas pipeline pressure to reduce the back pressure on the wellhead. Water baths may be necessary to prevent freezing during winter operations.

Depending upon the water disposal system in use it may be necessary to have up to 2,000 barrels of water storage capacity located at the separation facility. These tanks are typically heated during the winter to prevent freezing.

Compression of the produced gas can be required depending upon the sales line pressure. Typical San Juan Basin multi-well compression facilities consists of 300 to 500 horsepower, two or three stage, compressors with a 500 psig discharge pressure. Single well installations include

50 to 100 hp compressors installed adjacent to the well. The prime movers are generally fired by natural gas.

The natural gas is eventually compressed into the gas transportation systems that move the gas to the end user. The gas pipelines companies do not differentiate sales price or acceptability of gas based upon the reservoir type that the gas was produced from. As for gas production from other reservoir types, treatment may be required to reduce the concentration of contaminants such as carbon dioxide to pipeline quality specifications.

Effect of Gas Production Upon Coal Mining Operations

This section briefly discusses the effect of gas production upon coal mining operations. Generally, as mine operators are attempting to recover coal from deeper depths of burial, natural gas content of the coal increases that in turn increases the hazards due to explosions. In some areas, it is necessary to reduce the pressure contained within the coal to reduce the chances of a sudden rock outburst at the mine face. Extraction of the gas has no effect upon the coal properties that dictate the heating value or the end use of the coal.

Mine Safety Requirements

Regulations that provide standards for the underground coal mines are formulated by the Mine Safety and Health Administration ("MSHA") of the U.S. Department of Labor. Ventilation requirements by MSHA are detailed in 30 CFR part 75.300 sub-part D-Ventilation.[45] The ventilation requirements provide minimum standards for air quality, quantity, techniques and frequency of examinations, etc. However, each individual mine operator must submit for MSHA District Manager approval a specific natural gas and dust control plan for their underground coal mine operation. Generally, natural gas concentrations in an *active* working section and return air courses may not exceed one percent. In bleeder entries, inactive

areas and other special circumstances, the allowable maximum natural gas concentration is increased to two percent.

Mine ventilation systems alone may be inadequate to dilute methane concentrations below acceptable concentrations. Degasification techniques designed to produce natural gas in advance or in conjunction with mining have become more prevalent in the last decade. A brief overview of techniques commonly used by industry follows.

Degasification Techniques

Degasification approach for the Mine includes both "active" and "passive" degasification techniques. A brief overview of techniques commonly used by industry follows.

Active pre-mining degasification techniques include in-seam horizontal boreholes or stimulated vertical wells drilled in advance of mining. These techniques: (i) actively degasify the objective coal seam in advance of mining operations, and (ii) identify and degasify gas feeders associated with geologic anomalies.

Vertical degasification wells are typically stimulated with hydraulic fractures for gas production enhancement. Recent studies by the U.S. Bureau of Mines have indicated that the affect of hydraulic stimulation on the mineability of the coal seam is negligible. The major concern of operators is that the induced fractures will reduce the integrity of the roof rock resulting in roof falls. Numerous experiments have been performed by mining through induced fractures with little or no detrimental effects. In fact the Bureau of Mines has concluded that "No roof falls or adverse mining conditions were encountered that could be attributed to the stimulations."[46]

Horizontal boreholes are drilled from within the mine workings when accessibility to the coal is possible. Many longwall mines actively degasify the coal seam by employ-

ing relatively short, cross-panel degasification boreholes. Boreholes are drilled perpendicular to the longwall panels. Prior to mine-through, the cross-panel boreholes may be configured with packers for water infusion to improve dust control during mining.

An alternative to short cross-panel boreholes is to install long horizontal boreholes perpendicular to several longwall panels. Long cross-panel boreholes (e.g. 2,000 feet) may be drilled as soon as a longwall area is outlined on one side. Degasification of several longwall panels and development entries may be accomplished by a single series of boreholes. Prior to mine-through by the development section, the boreholes can be flooded with water to reduce dust emissions. After mine-through, a packer may be set to allow continued production of the initial portion of the borehole through the existing pipeline. Another pipeline is installed after mine through to continue production of the remainder of the borehole.

Long horizontal boreholes with lengths in excess of 4,000 feet can be drilled into virgin coal to produce gas far in advance of mining. This technique can be used to facilitate the construction of the initial mine gate roads.

Passive degasification techniques produce little to no gas prior to mining and are typically completed in strata above the coal seam. Gas production is initiated as a result of subsidence after mining occurs. Generally, the use of a surface blower/exhauster is required to enhance gob gas productivity due to the low pressure within the gob area. Passive degasification techniques include vertical gob ventilation boreholes, short cross-measure boreholes and long gob holes drilled from within a mine.

Vertical gob ventilation boreholes are commonly used in conjunction with longwall panels in eastern mines. Two to four boreholes are drilled per panel, slightly offset from center. A typical borehole is completed fifty feet above the coal seam being mined with the last two hundred feet completed with slotted casing.

Cros-measure boreholes are small-diameter, inclined boreholes drilled from underground locations into roof strata overlying the longwall panel that will be fractured when the panel is removed. Gob gas is collected from the cross-measure boreholes and drawn through an underground pipeline to a vertical well using a surface vacuum pump.

Conclusion

In my opinion, the matters discussed in the preceding sections establish, from the technical and scientific point of view, that the natural gas found in coal seams (often referred to as "coalbed methane") is separate and distinct from the coal itself and should be considered in the same manner as natural gas from any other type of natural gas reservoir.

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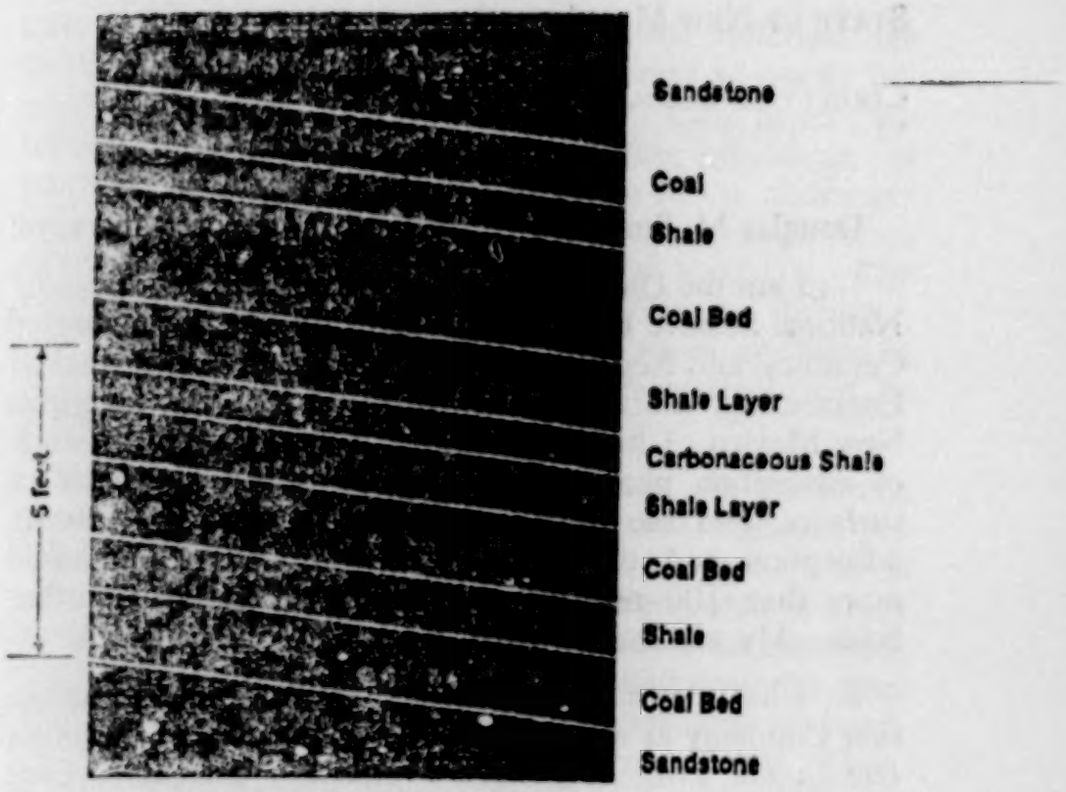

Figure 2.
Interbedded Raton Basin Coal Zone

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

AFFIDAVIT

Douglas M. Smith, being duly sworn, deposes and says:

1. I am the Director of the University of New Mexico/National Science Foundation Center for Micro-Engineered Ceramics, and Regents Professor of Chemical and Nuclear Engineering, University of New Mexico, Albuquerque, New Mexico. I have engaged for many year in the study of adsorption phenomena, the physics and chemistry of surfaces, and the behavior of gases and liquids during adsorption and desorption processes. I have authored more than 100 refereed publications in these and other fields. My curriculum vitae is attached as Exhibit A.

2. I have been engaged by counsel for Amoco Production Company as a consultant in connection with *Southern Ute Indian Tribe v. Amoco Production Company,* Civil Action No. 91-B-2273, United States District Court for the District of Colorado, and have submitted a report and have been deposed in that action. A copy of my report entitled "Coalbed Methane Adsorption and Migration" is attached as Exhibit B, and I adopt and make this report part of this affidavit.

3. Among other matters, I have reviewed the portions of the brief submitted by the plaintiff in connection with summary judgment motion, the affidavits of Messrs. Bend, Cooper, Creel, Levine and Marsh furnished with that brief, and the reports previously furnished by them to Amoco's counsel. I am making this affidavit in partial response to some of the matters and issues raised in those materials.

4. Coal, like nearly all solid materials, is porous, and can adsorb gas on its external and internal surfaces. Coal is not unique in that regard. The porosity of solid materials varies greatly, from extremely porous materials like zeolite (a material used in water softeners) to nearly impervious materials such as solid metals. Coal as an "adsorbate" (*i.e.*, a material onto which other substances are adsorbed as "adsorbents") is somewhere in the midranges of porosity. Adsorption takes place in openings, often referred to as "pores," within the solid materials. The more such openings there are, the smaller the diameter, and the higher the total volume of the space available in such openings, the more of the adsorbent which will be adsorbed.

5. Adsorption is a common phenomena. In every case where gases and solid surfaces are present together, gas will be adsorbed onto the surface. Thus, oxygen or air is adsorbed on the surfaces of walls, furniture, etc., in every room. When gas is physically adsorbed onto an adsorbent (such as methane on coal), the adsorbed material does not remain static. The molecules are constantly exchanging with other molecules found in different states. Thus, in coal, if methane is present it will be found within the empty spaces within the solid coal as a gas, as adsorbed molecules on the coal surfaces and dissolved in any water which may be present. The methane in the three states is constantly exchanging from one state to the other, with the system being in equilibrium, unless something changes, such as the ambient pressure, in which the relative proportions in the various states will change in accordance with known laws. This situation exists in all adsorbent-adsorbate systems; it is not unique to coal. It also exists in all natural gas reservoirs; only the relative quantities change depending on the properties of the particular substances involved, not the basic mechanisms.

6. The process by which methane is adsorbed on coal is generally reversible, and the methane can be adsorbed and desorbed without any change in the chemical nature of either the methane or the coal, merely by changing the pressure. Coal can adsorb any gas with low molecular

weight, and desorb it as well. In neither case does either the adsorbed gas or the coal change its essential nature.

7. These general principles are explained more fully in the report attached as Exhibit B.

8. The term "grid locked" is used in the plaintiff's brief, Br. 32. To my knowledge, this is not a term with a scientific or technical meaning. If it is intended to mean that methane is static within the coal and that the state of the methane does not change within the equilibrated system, or that the methane will stay within the coal when the pressure changes, then it is misleading and inaccurate. Professor Marsh seems to say, however, that it means no more than that "coalbed methane is located primarily within the macro-molecular structure of minerals." Marsh Affd, p. 9, ¶ 4.3.7. This says only that the empty spaces (*i.e.*, the pores where the methane is adsorbed) are inside the solid coal material (*i.e.*, macerals), a fact which is obvious.

Dated this 5th day of November, 1993.

/s/ Douglas S. Smith
DOUGLAS S. SMITH

[Notary Omitted]

Coalbed Methane
Adsorption and Migration

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Summary

Per your request, a description of the storage and migration of coalbed methane is presented. Methane and other gases such as carbon dioxide, ethane, nitrogen, etc. produced from the coalification process and possibly, from migration from deeper source formations, accumulate in the coal seam. This gas actually exists as an equalibrium system between three different states; free gas, adsorbed gas, and dissolved gas in water. The adsorbed gas is the result of physical adsorption which is a reversible process. Individual molecules are rapidly and continually exchanging from one state to another. As an example, the characteristic time when an individual molecule is *adsorbed is on the order to one millionth of a second.* This situation is no different than for other natural gas formations except that the relative fraction in the adsorbed state is higher because of the higher surface area to pore volume ratio of coal. However, coal is not unique in its pore structure and adsorption capacity and actually has mediocre properties as compared to many adsorbents such as activated carbons and zeolites. As the pressure in the coal formation is lowered, gas and water flow to the wellbore. As the pressure is lowered, gas desorbs from the adsorbed state and gas is released from the dissolved gas state. During production, water is removed from the fractures in the coal, which allows higher production rates because of the higher relative permeability as in any gas reservoir. However, because of the great affinity (both adsorption and capillary pressure related), water is never removed from the microporosity of the coal during production.

I. Introduction

The term coalbed methane refers to a mixture of gases produced from coal seams for degasification purposes before mining or the commercial production of natural gas. Despite the name, coalbed methane includes a number of gases including methane, ethane, propane, trace

quantities of higher hydrocarbons, nitrogen, carbon dioxide, water, and helium. In the remainder of this report this term will be used and implies a gas mixture. In a coal seam, gas occurs in three different states; 1) free gas, 2) adsorbed gas, and 3) dissolved gas in water. These three states are in equilibrium and there exists a constant and rapid interchange of molecules between the three states. Therefore, it is impossible to think of each state as being independent but rather, all three must be considered as a single system. These three states are characteristic of all natural gas reservoirs. The relative fractions of gas in these three states for a given reservoir depends upon the water content, the internal surface area to pore volume ratio, the pore size, temperature, and pressure of the reservoir. As the pressure is lowered, the fraction of gas adsorbed on the surface will decrease. Because of the higher surface area to pore volume ratio of coals resulting from their smaller pore sizes as compared to most natural gas reservoirs, a larger fraction of gas at a given instant occurs as adsorbed gas.

II. Definitions

Since the coal literature is filled with confusing terminology, it is important to start with a set of definitions in the areas of adsorption and porosity.

II.1 Adsorption

All molecules in the gas state ("free gas") undergo interactions with solid surfaces. For all surfaces, a certain fraction of the surface is covered with adsorbed molecules ("adsorbed gas"). These adsorbed molecules have properties such as density which are much closer to those of a liquid or solid than that of the free gas. The fraction of the surface which is covered depends upon the gas, its pressure, and temperature. The relative fractions of free and adsorbed gas thus depends on the fraction of surface covered and the surface area to pore volume ratio of the

porous solid. The forces which cause adsorption vary but adsorption can be broken down into two distinct subsets, physisorption and chemisorption. Because these two subsets are different, they will be discussed separately.

II.1.a Physisorption or Physical Adsorption—This type of adsorption is nonspecific and is similar to condensation (the phase change of a gas to a liquid). Weak van der Waals (attractive "dispersion" and repulsive) forces lead to *heats of adsorption which are on the same order as the heat of condensation, 0.5 to 5.0 kcal/mole* (Smith [1970]). Equilibrium is rapidly achieved between the free gas and adsorbed states and the amount adsorbed is a function of temperature. Physical adsorption is usually nonspecific and is observed for all gases and surfaces. The effect of polarity in either the adsorbate (the gas) or the adsorbent (the solid) can serve to increase the adsorption attraction between the surface and gas and thus, make physical adsorption specific. For nonspecific physical adsorption, only dispersion and repulsive forces are involved as discussed above. For specific physical adsorption, coulombic interactions add to the adsorption attractions. However, for saturated hydrocarbons such as methane, ethane, propane, etc., specific physical adsorption will not occur as demonstrated via the Kiselev [1965] classification system (note: this is not true for water which both physically adsorbs on specific sites and chemisorbs as discussed in subsequent sections). The chemical nature of the adsorbed gas is very similar to that of condensed gas as measured with probes such as infra-red, Raman, and nuclear magnetic resonance spectrocopy. The quantity of gas adsorbed at a given pressure and temperature is proportional to the total surface area.

Since the interactions causing physical adsorption are similar to phase change, the process is *reversible*. Physical adsorption is a dynamic process in which molecules are always leaving the surface for the free gas and new molecules are always adsorbing. Hence, the net quantity ad-

sorbed at a given time is related to the relative rates of adsorption (condensation) and desorption (evaporation). de Boer (1953) has written a text on this point in which he introduced the concept of an adsorption time. At 25°C and for the heats of adsorption characteristic of physical adsorption (0.5 to 5 kcal/mole), typical residence times as adsorbed gas on the surface are of the order of 10^{-12} to 10^{-7} seconds. If one were able to observe a single gas molecule in space, it would strike the surface (assuming that the surface is not already covered with adsorbed molecules), remain adsorbed for these very short times, and then desorb and again become a free gas molecule.

II.1.b Chemisorption or Chemical Adsorption—In contrast to physisorption, chemical adsorption involves the formation of strong chemical (ionic, covalent) bonds between the surface and the adsorbed molecules. Heats of adsorption are on the order of those involved in chemical reactions, 5 to 100 kcal/mole. Chemisorption is usually irreversible and is limited to certain solids and gases. The chemical nature of the adsorbed gas is distinctly different than that of condensed gas as measured with probes such as infra-red, Raman, and nuclear magnetic resonance spectroscopy. The quantity of gas adsorbed at a given pressure and temperature is usually not proportional to the total surface area.

II.1.c The Adsorption Isotherm—The magnitude of adsorption for a particular gas and solid is usually presented as an adsorption isotherm. This is a plot which indicates the quantity of gas adsorbed (usually in moles or volume of gas per mass of solid) as a function of gas pressure at a fixed temperature. This plot is usually determined experimentally. Often, the pressure (P) scale is normalized by the saturation pressure (P_o) of the gas at that temperature. P_o is the pressure at which the gas will condense to a liquid at that temperature. Thus, at relative pressure (P/P_o) equal to one, the porous solid will spontaneously fill with liquid. The shape of the isotherm is a

function of the pore size distribution of the adsorbent and the relative attraction of the gas and surface.

A large number of models have been proposed to describe the variation in gas uptake with pressure. One of the simplest and most often applied for microporous materials is the Langmuir isotherm (Langmuir, [1916]). At equilibrium, the rates of adsorption and desorption must be equal. The rate of adsorption is obtained from kinetic theory of gases and the assumption that molecles will only absorb if they strike the surface where no adsorbate exists. Thus the rate of adsorption is proportional to the fraction of surface which is not covered. The desorption (evaporation) rate is the same as for evaporation from a liquid except that it is proportional to the fraction of the surface which is covered and the heat of adsorption is used instead of the heat of condensation (although both are of the same order for physial adsorption). From this, the Langmuir isotherm is obtained which relates the adsorption uptake to the gas pressure and constants, V_m and b. The isotherm is $V/V_m = bP/(1+bP)$. V_m is the monolayer capacity and b is a constant related to the temperature and the interaction between the gas and the surface. A typical isotherm is plotted in Figure 1.

Many other isotherms exist and all include the concept that adsorption is a dynamic process but the Langmuir model is the predominant model used for high pressure methane adsorption. One isotherm of note is the Braunauer-Emmit-Teller (BET) isotherm which is an extension of the Langmuir isotherm. The BET model is used in conjunction with nitrogen adsorption at 77 K to yield the total surface area. For microporous materials, the determination of surface area is more problematic and depends upon the type of material. For carbons and coals, the standard method of surface area determination is to use carbon dioxide adsorption at 273 K (Walker and Kini [1965]) and analyze the resulting adsorption isotherm using the

Dubinin-Polyani or Dubinin-Radushkevich equations (see Gregg and Sing, [1982]).

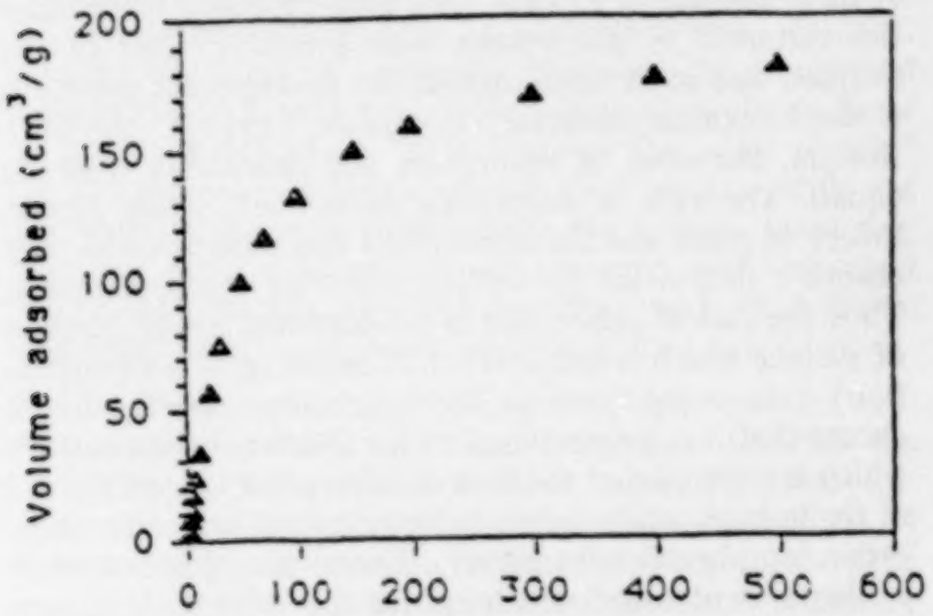


Figure 1 Langmuir isotherm for a V_m value of 200 cm^3/g and a b value of 0.002 $psia^{-1}$.

II.2 Porosity

Most solids of practical interest contain porosity on some length scale. The presence of this porosity may be favorable (i.e., the pores in a sponge leading to its compressibility, the pores in bread created by carbon dioxide generation causing the bread's texture, the pores in zeolites used in detergents to adsorb and ion exchange ions in hard water, pores in polyuretane insulation to lower heat conduction) or unfavorable (the pores contained in steel as a result of excessive dissolved gas leading to lower mechanical strength, pores in glass affecting clarity, etc.). Because pore structure is of such interest, structure evolution and the porous solid characterization are significant areas of scientific investigation.

Porosity occures over many length scales from defects in crystalline materials (<0.1 nm) to large cracks/fractures/voids which may be on the same order as the sample itself. Porosity may be open (accessible to gases) or closed (inaccessible to gases). In general, porosity is defined as the volume fraction of a porous solid which is not a dense solid. One way to determine this value is to measure the bulk density (the mass of solid per total volume) designated as pb via displacement in a nonwetting fluid such as mercury and the true or skeletal density designated as pt by displacement with helium. Density values are typically given in units of g/cm^3. The porosity, ϵ, is then given by $\epsilon = 1\text{-}pb/pt$ assuming that no closed porosity exists. Another approach is to measure the pore volume which is the volume of pores per mass of solid by gas adsorption/condensation or mercury porosimetry (defined below). The pore volume, Vp, normally has units of cm^3/g and is related to the porosity by $\epsilon = Vp/pb$ or $\epsilon = Vp/(Vp\text{-}1/pt)$. The properties of a porous solid are typically fixed by three main structural parameters; the porosity, the surface area, and the pore size distribution. Since surface area is almost always measured by adsorption, that point was covered in Section II.1. Pore size classification and measurement is discussed below.

II.2a Microporosity—Pores with characteristic width of less than 2nm. The adsorption interaction potential is significantly higher than on a flat surface as a result of the close proximity of both pore walls. This leads to greater uptake of a given gas at a fixed temperature and pressure. This occurs because of the greater adsorption potential and the high internal surface area to volume ratio of these solids. Many commercial adsorbents such as activated carbons, zeolites, and silica gels contain primarily microporosity. Microporosity is sometimes divided further into ultramicropores and supermicropores.

II.2b Mesoporosity—Pores with characteristic widths between 2 and 50 nm. In addition to adsorption, when the pressure of the gas is sufficiently high, P/Po>0.3, capillary condensation of gas may occur in the pores as a result of the Kelvin effect. The Kelvin effect arises from the change in saturation pressure as a function of curvature. In small pores, condensation occurs at lower pressure because of the small pore size. This does not occur for micropores since the pores are completely filled before sufficient pressure is reached to enable condensation.

II.2c Macroporosity—Pores with characteristic widths greater than 50 nm. These pores are sufficiently large such that the pores may be considered to be a flat surface from an adsorption viewpoint. At a given relative pressure, the fraction of free gas to adsorbed gas is much higher since the surface area to pore volume ratio is much lower.

II2.d Pore size measurement—A number of different techniques exist for measuring pore size depending upon both the pore size and the material. The main techniques are summarized below.

II.2.d.1 Adsorption/Condensation—These two techniques are combined since they both employ the same basic experimental measurement (an adsorption isotherm) but employ different physical principles, theoretical analysis, and different pressure regions of the isotherm. For mesoporous solids, the lowering of the pressure required for gas to condense as a result of pore curvature is used to obtain a pore size distribution for pores in the size range of 2 to 100 nm. Analysis consists of analyzing either the adsorption or desorption branches of the isotherm in the relative pressure range of 0.3 to 0.99 using the Kelvin equation and a model isotherm to correct for the thickness of the adsorbed phase before condensation occurs. For microporous solids, the enhancement of adsorption as a function of pore size in the P/Po range of 0 to 0.3 is used to obtain a pore size distribution. This approach is very

model dependent. Techniques employed include a series of models proposed by Dubinin and co-workers (D-R, D-A), the mp method, the a-plot method, and the H-K method.

II.2.d.2 Mercury porosimetry—This employs the fact that mercury will not wet a surface and thus, must be forced into a pore. The pressure required to force the mercury into a pore is a measure of pore size. From the mercury surface tension, the contact angle that the mercury meniscus forms in a pore, and the pore geometry, the pore size may be found from the pressure using the Washburn equation. For a typical contact angle, a pressure of 30,000 psia will force mercury into a pore of 3 nm radius. Intrusion at lower pressures implies larger pores.

II.2.d.3 Scattering—Scattering techniques such as small angle X-ray (SAXS) and small angle neutron (SANS) scattering probe pore structure on the 0.3 to 100 nm range. Scattering probes both open and closed porosity but suffers from disadvantages include the relation of scattering intensity versus scattering vector size and the fact that it is affected by hetrogeneities in the solid phase.

II.2.d.4 Other methods—Many other techniques exist for studying pore structure including low field NMR, high field NMR, microscopy (SEM, TEM, optical), thermoporometry, and positron emission decay. However, these techniques are more specialized and not in general use.

II.2.d.5 Notes on pore sizing—It is important to point out that pore size analysis is almost always conducted on dried samples. Of course, drying changes the pore structure of many materials as the capillary pressure associated with fluid removal causes some pore collapse/shrinkage.

III. Coal Pore Structure

Because the ability of coal to adsorb large quantities of gas is related to its pore structure, a review of the pore

structure of coal is necessary. Before this discussion is started, it should be noted that almost all pore structure characterization has been conducted on *dried coals*. As with all porous materials with fine pores which are initially wet, the pore structure will change during drying. This is a result of the large capillary forces exerted on the pores during drying. The extent of shrinkage is a balance between the capillary pressure (which is inversely proportional to pore size) and the solid matrix strength (or modulus). For weak amorphous materials such as silica gels and coals, the extent of shrinkage can be significant and hence, the pore structure information reported in the literature may not be directly relevant to coal pore structure in the formation. But during production of coalbed methane, the micropores never dry out and hence, the majority of the shrinkage observed during complete drying in the laboratory will not occur.

The main efforts on pore structure characterization of coal have been reported by Anderson and co-workers [1956] and by Walker's group at Penn State as reported by Gan, Nandi, and Walker [1972]. Reviews on coal pore structure characterization have been published by Mahajan and Walker (1978), Mahajan (1982), and Mahajan (1984). The pore structure of coal is complex and heterogeneous and consists of pores ranging in size from those of helium dimensions (~0.2 nm) to large macropores. Coals share many similarities with activated carbons derived from natural sources such as coconut chars. The pore structure of coal is a function of rank. Typically, the porosity varies from 5 to 20% with the majority of the porosity existing in micropores. This leads to surface areas from CO_2 adsorption on the order of 200 m^2/g. Typical pore sizes in the micropore region are on the order of 0.8 to 1.2 nm for coal. Some variation in surface area with rank is observed but in general, all coal surface areas are in the range of 100 to 400 m^2/g. By comparison, surface areas of commercial adsorbents are generally higher (e.g., silica gels 100-1,000 m^2/g, activated carbons, 200-2,500 m^2/g). Gan, Nandi, and Walker [1972] used mercury porosimetry and nitrogen condensation to show that porosity exists in pore sizes in both the mesopore and macropore size ranges in addition to microporosity. In addition to the pore structure of dry coals, some work has been carried out on wet coals. Glaves and co-workers [1988] used a low field NMR technique to show that for water saturated coals, monomodal, bimodal, and trimodal pore size distributions are observed as a function of rank. Pore sizes in the micropore, mesopore, and macropore size ranges were observed. However, these were coal samples which had been previously dried and resaturated. Little other pore structure information exists for wet coals since conventional pore size analysis techniques require dry samples.

IV. Coalbed Methane

The term coalbed methane refers to a mixture of gases produced from coal seams for degasification purposes before mining or the commercial production of natural gas. Coalbed methane includes a number of gases including methane, ethane, propane, trace quantities of higher hydrocarbons, nitrogen, carbon dioxide, water, and helium. In a coal seam, gas occurs in three different states; 1) free gas, 2) adsorbed gas, and 3) dissolved gas in water. These three states are in equilibrium and there exists a constant interchange of molecules between the three states. Therefore, it is impossible to think of each state as being independent but rather, all three must be considered as a single system. These three states are characteristic of all natural gas reservoirs. The relative fractions of gas in these three states for a given reservior depends upon the water content, the internal surface area to pore volume ratio, the pore size, temperature, and pressure of the reservoir.

The quantity of gas in the free state at a given time depends solely on the reservoir pressure, temperature, and

the pore volume which is not filled with water or adsorbed gas. Therefore, the quantity of free gas may be determined directly from equations of state (i.e., thermodynamic functional relationships which relate molar density, pressure, and temperature). Free gas will only exist in the coal fractures and mesoporosity/macroporosity since the micropores will remain saturated with liquid water under reservoir conditions during coalbed methane production.

The fact that methane and other gases adsorb on coals and carbons has been known for many years. On the internal surface of coal (from fractures to micropores), gas molecules adsorb and are in dynamic equilibrium with the free gas as well as dissolved gas in water. As discussed previously, the interchange between adsorbed and free gas is extremely rapid. As the pressure is lowered, the fraction of gas adsorbed on the surface will decrease. A more complete discussion of adsorption in coal in given in a following section.

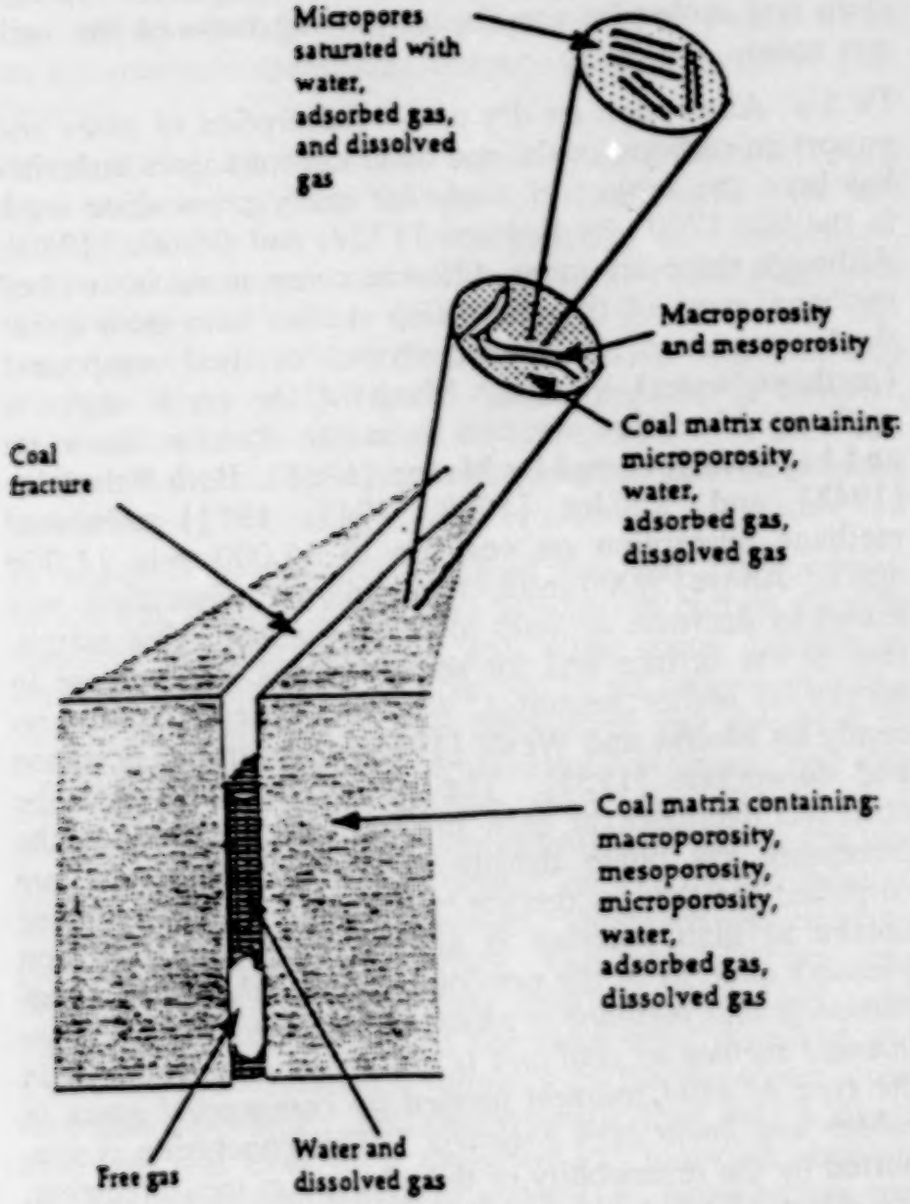
In addition to free and adsorbed gas, gas exists as dissolved gas in reservoir water. Similar to carbon dioxide dissolved in soda, methane and other gases dissolve in water. This phenomena is observed in all water-containing natural gas reservoirs. The amount of gas dissolved in water depends upon the temperature, pressure, and the solubility of the gas (typically given as a Henry's law constant which relates the concentration of gas in the gas phase to that in the liquid phase) as well as the relative water saturation of the formation. Dissolved gas and free gas are in dynamic equilibrium. Gas molecules are continually striking the gas-water interface, absorbing, and diffusing into the water. At the same time, dissolved gas molecules are continually diffusing to the gas-water interface and desorbing. The characteristic time that a single molecule will exist as a dissolved gas molecule depends on the caracteristic length of water (i.e., between free gas pockets). For a typical maximum continuous water length

of 1 mm, typical characteristic times as a dissolved gas molecule are 10 to 1,000 seconds.

Figure 2 is a conceptual diagram illustrating the distribution of coalbed methane and water in coal. However, it is important to remember that this is a dynamic equilibrium and molecules are always moving between the various states.

IV.1.a Adsorption on dry coal—Adsorption of gases and vapors on carbons, coals, and other carbonaceous materials has been the subject of study for many years since work in the late 1700's by Fontana [1777] and Scheele [1780]. Although there are many different components in coalbed methane, most of the adsorption studies have used either single component (methane, ethane) or dual component (methane/water) systems. Much of the early work on methane adsorption on coal is in the Russian literature and has been reviewed by Menon [1968]. Both Palvelelev [1948] and Khodot [1948, 1949, 1951] measured methane adsorption on coal up to 15,000 psia (1,000 atm). Above 3,000 psia, the apparent adsorption was found to decrease or only increase slightly. This saturation of the surface and for some samples, as decrease in uptake at higher pressures, was also observed more recently by Moffat and Weale [1955] and van der Sommen and co-workers [1955]. The last group concluded the observed decreases at high pressure are a result of the increasing gas phase density and when the results are corrected for the gas density, a plateau value of methane uptake at high pressure is always observed. Based on Menon's analysis of the previous papers, "*the general conclusion is that methane is physically adsorbed on the large internal surface of coal and is not chemisorbed or held in the type of solid solution formed by compressed gases in rubber and linear high polymers.*" This conclusion is supported by the reversibility of the adsorption measurements, the effect of temperature, and the limiting high pressure behavior. The main motivation for studying methane ad-

Figure 2 Pore structure and spatial distribution of coalbed methane and water.



sorption in coal was for controlling gas emissions during mining operations. In 1978, the International Energy Agency (of which the USA is a member) undertook a review of methane retention (adsorption) and migration which is summarized by Curl [1978]. This report reaffirms the concept that gas is physically adsorbed on the surface of coal. Recent reviews continue to affirm that the accepted form of methane storage in coal is via an *adsorption* process (see Ayoub et al [1991].

IV.1.b Adsorption on wet coal—Coal, as any porous material, has a finite internal surface available for adsorption. Even in 1936, it was recognized that the presence of water reduced the capacity of coal to adsorb methane (Coppens, [1936]). A number of investigators noted that increasing water contents led to lower methane uptake at a given pressure and temperature. Joubert and co-workers [1973] have shown that there exists a critical moisture content above which no further decrease in methane adsorption capacity is noted. The level of this critical moisture content was in the range of 1 to 5% water and depended upon the coal composition. They concluded that the variation in the critical moisture content coincided with the water adsorption uptake and resulted from the dependence of water adsorption on pore surface chemistry. The specific nature of water adsorption was supported by Mahajan and Walker [1971] who measured water adsorption isotherms on previously dried coals. They showed that unlike methane adsorption, water adsorption is specific with adsorption occurring first at oxygen functional sites and subsequently on the water "islands" which form. Joubert and co-workers [1973] concluded that additional water above the critical moisture content did not affect methane uptake since this additional water was not adsorbed but condensing in the pores.

IV.1.c Multicomponent adsorption

As described above for methane and water, coalbed methane storage is basically a competition for adsorption be-

tween the various components of the gas. Since water has the lowest saturation pressure of the various major gas components, it has the greatest potential to adsorb. The capacity to adsorb any single component depends on all of the gases/vapors present. Ruppel and coworkers [1972] measured adsorption of methane and ethane on dry coals and theoretically predicted the behavior of mixtures. More recently, Arri and coworkers [1992] have measured multicomponent adsorption (methane/nitrogen, methane/carbon dioxide) on wet coals. They found that at a given pressure and temperature, the presence of nitrogen or carbon dioxide resulted in lower methane adsorption. The effect of the various components could be described by a multicomponent Langmuir isotherm which provides further evidence that the adsorption of methane is purely a physical adsorption process.

IV.1.d Effect of adsorption on coal

Whenever a gas adsorbs or desorbs in a porous material, it introduces some macroscopic and reversible changes. These are primarily the result of release of capillary forces associated with removal of menisci during drying/desorption, which for wetting fluids, cause considerable internal stress. The capillary pressure is inversely proportional to pore size and in small mesopores, the magnitude of capillary pressure may exceed 10,000 psia. This phenomena is commonly observed in drying of porous materials and leads to macroscopic shrinkage. The magnitude of the shrinkage during drying/desorption depends upon the bulk modulus (strength) of the solid matrix. Macroscopic changes in a solid can also occur if the pore fluid exhibits significant hydrogen bonding with the coal matrix. However, during coalbed methane production from a coal seam, the micropores will not dry out and the coal will retain much of its residual moisture. Thus shrinkage due to either capilllary pressure-induced shrinkage or hydrogen bonding effects will be negligible.

IV.2 Migration

The retention and migration of coalbed methane are intimately related. Coalbed methane is produced by drilling a well and lowering the formation pressure at the wellbore. As in conventional natural gas formation, a pressure gradient drives the gas to the wellbore. In Curl's IEA review [1978], he notes that "only methane in the free gas state can flow." As free gas and water flow occur to the wellbore, the formation pressure is lowered allowing gas to desorb from the surface and to leave the dissolved state in the water. Since flow in coal formation is dominated by flow in the fractures, as it is in many low permeability formations, gas production rates are low until the water content of the fracture is lowered. This results in a much higher relativve permeability and hence, higher gas production rates (see Dullien, [1979]). However, because of the great affinity (both adsorption and capillary pressure related), water is never removed from the microporosity of the coal during coalbed methane production. As formation pressures continue to drop, more gas is desorbed and comes out of the dissolved state. The relativve fractions of these three states at the initial reservoir conditions will affect the gas production rate history.

During production, as in a virgin coal seam, molecules of water and gas continually move. This may be the result of two different mechanisms, convection and diffusion. If a pressure gradient exists in a given direction through the seam, water flow will occur just as ordinary ground water is continually moving through the ground. As the water moves, pockets of free gas and dissolved gas will also move. Since the interchange between the free gas, adsorbed gas, and dissolved gas is rapid as compared to these water velocities, molecules of all three gas states move via this process. This transport via a pressure gradient is referred to as convection. Even in the absence of a pressure gradient, water and gas molecules will be continually moving as a result of Brownian motion or diffu-

sion. Gas and liquid molecules are not fixed in space but are always moving. This causes the constant and rapid interchange of gas molecules between free gas, adsorbed gas, and dissolved gas. When additional methane is generated from the coal, this methane becomes a part of the entire system. Thus, there is a constant exchange and replenishment of newly generated molecules with those already present in the system. Also, individual water molecules in the fractures are always exchanging with water in the macroporosity, mesoporosity, and microporosity.

VI. Responses to Specific Questions

VI.1 Discussion of Coal Structure

In recent years, a model of the basic chemical structure of coal has been proposed which is visualized as a three-dimensional, cross-linked macromolecular network referred to as the immobile phase and a second phase composed of smaller molecules which is usually referred to as the "mobile" phase. However, this "mobile" phase is not to be confused with adsorbed molecules. The term mobile is derived not from the ability of the molecules to rapidly move in the coal but rather, the behavior of protons to relax as probed via NMR. This may be taken to be a measure of the "stiffness" of the molecule in which the proton resides. To remove the mobile phase, rigorous conditions such as high temperature (>300°C) and/or extremely polar solvents such as pyridine are required. This removal is a *non-reversible* process in the sense that the immobile and mobile phases cannot be put back together in their original state. In contrast, coalbed methane is readily removed at room temperatuure and can be put back into the coal pore structure (*reversible*). Although the relative proportion of the "mobile" phase is the subject of debate, it is clear that the molecular weight of the "mobile" components is in the range of 100 to 10,000.

This is significantly different than the molecular weight of 16 for methane.

VI.2 Similarities and Differences between Water and Methane

As individual compounds, water and methane are significantly different and this is primarily the result of hydrogen bonding. When a molecule contains hydrogen bonded to either fluorine (F), nitrogen (N), or oxygen (O), hydrogen bonding is important. Hydrogen bonding has strength on the order of 5 kcal/mole and is the reason why water's boiling point is 373 K and methane's is 112 K. Because of hydrogen bonding, water and methane interact in completely different fashion with the coal struture. Methane only physically adsorbs on the coal surface. In contrast, water reacts in several ways. These include bulk water in the fractures and macro/mesopores, physically adsorbed water with specific adsorption on the surface, chemisorption of water, and water hydrogen bonded in the coal structure.

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STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

AFFIDAVIT

Dan Yee, being duly sworn, deposes and says:

1. I have a Ph.D. degree in Engineering Science, and am now and have been for twelve years employed by Amoco Production Company ("Amoco") in its Research Department, Tulsa, Oklahoma. My area of specialization is in the basic and applied research and technological planning and development, of coalbed methane resources. I have published a number of papers in this field. My Curriculum Vitae is attached as Exhibit A.

2. I have been acting as a consultant for counsel in connection with *Southern Ute Indian Tribe v. Amoco Production Company,* Civil Action No. 91-B-2273, United States District Court for the District of Colorado, and have been deposed in that action. A copy of my report entitled "Sorption of Gas in Coal" is attached as Exhibit B.

3. Among other things, I have reviewed portions of the brief submitted by the plaintiff in connection with summary judgment motion, the affidavits of Messrs. Bend, Cooper, Creel, Levine and Marsh furnished with that brief, the reports previously furnished by them to Amoco's counsel, and other materials submitted by plaintiff. I am making this affidavit in partial response to some of the matters and issues raised in those materials.

4. Following this review, I have reached certain conclusions and opinions, which are stated and explained in the following paragraphs.

5. In the plaintiff's brief, there are numerous references to "town" gas and "producer" gas. (Br., pp. 30, 41-42, 55-56). Such gas is completely unlike coalbed gas in most respects.

a. It was not found in the coalseams, but artifically manufactured in coal by inducing chemical reactions by subjecting coal to high temperatures in specially designed equipment.

b. When coal is used to produce such gas, the coal is destroyed. What is left may be tarry residues, coke, or other by products, but the residue is in no sense coal.

c. It is irrelevant whether the coal used as a source material for town gas contained methane or not. The gas product sought and obtained was the result of the breakdown of coal into noncoal products, *not* any residual methane which the coal might have contained.

d. Methane, CH_4, constitutes only a small part of town gas, unlike coalbed gas where methane constitutes a major part. The principal components of town gas were carbon monoxide (CO) and hydrogen (H_2). The BTU content of the typical town gas was far lower than that of typical coalbed gas. Typically town gas has 10-20% of the heating value of natural gas or coalbed gas.

e. The production of town gas is not dependent on coal, and especially not on coal with any particular properties or composition. It can be manufactured from many organic materials, including straw or sawdust.

6. Plaintiff's brief also makes several references to "volatile matter" in coal, and to testing for "volatile matter". (Br., pp. 53-55, 57-60.). However, this "volatile matter" was not the coalbed gas produced by the coalification process over millions of years and found as CH_4 in coal seams. This "volatile matter" is the breakdown product of coal, whereby coal, is broken down under carefully controlled and defined conditions by standard tests, after

exposure to high temperature conditions which would never occur naturally in the coalification process. Gas found in the coal samples, if any, would form a negligible amount of this "volatile matter". The tests for "volatile matter" could be and were performed on coal samples entirely without regard to whether they had come from methane-containing coal deposits.

7. The gas sorbed on coals is measured by an entirely different, and non-destructive, test. This measurement is made by rapidly retrieving coal samples from the formation of interest, placing them in a sealed canister, and measuring the amount of sorbed gas that is released or desorbed. The procedure is the same as allowing the gas to desorb into the atmosphere after mining. The sealed canister simply provides a convenient enclosure to permit the gas to be practically captured and measured. Core or drill cuttings samples are commonly used. As soon as the pressure is reduced, the sorbed gas will begin to desorb and be released into the surroundings as a free gas. The retrieval of the samples must be rapid since a coal sample can easily lose one-quarter to one-half or more of its total gas content in the few minutes and hours that it takes to get to the surface. Fruitland coals from the San Juan basin will typically desorb 25% of its total gas content in just 65 minutes, 50% in 300 minutes, and 90% in 1800 minutes (1.25 days). Virtually all of the gas will be desorbed in less than 7 days.

8. "Rank" is a parameter used to judge the type and nature of coal deposits. The tests for rank do not depend on whether the coal sample under consideration contains or ever contained methane.

9. Plaintiff's brief refers to differences in behavior between sandstone and coal reservoirs which contain natural gas, as being governed, in the sandstone case by Darcy's law of gas movement and in the case of coal by Fick's law of diffusion. However, both laws measure the

movement of gas within a reservoir, and the fact that these laws are applicable at all shows clearly that the gas is separate and distinct from the reservoir matrix itself. Which law applies depends on the characteristic of the matrix not upon the presence or absence of coal. For example, the gas movement and reservoir characteristics in a Devonian shale gas reservoir would be measured by application of Fick's law.

10. The plaintiff's brief, and the expert documentation analogize coalbed gas to water. The analogy is not appropriate.

a. *First,* moisture content is important in the marketing and use of coal for the sample reason that energy expended to evaporate moisture in coal is lost as fuel; therefore the drier the coal the better. Also, water in coal adds materially to costs of shipping coal. By contrast, the methane content of the coal is irrelevant in the coal marketplace.

b. *Second,* definitions of coal often refer explicitly to moisture. No authoritative definition of which I am aware makes any reference to methane.

Third, water is bonded to coal by a different, and much stronger, mechanism (hydrogen bonding), than in methane (bound only by weak Van der Waal forces).

Fourth, even after long exposure to air, water remains in coal, while all or nearly all of the methane is released from coal fairly quickly after exposure.

Dated this 5th day of November, 1993.

/s/ Dan Yee
DAN YEE

[Notary Omitted]

SORPTION OF GAS ON COAL

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Amoco Production Company
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INTRODUCTION

Coal has the ability to sorb gases like other well known sorbents such as silica gels, activated carbons, activated aluminas, and zeolites. Sorption refers to the process by which a gas is held on a surface in a condensed or liquid-like phase. The gas is sorbed on the internal surface area connected with the open microporosity or internal free volume of the solid coal. The following discussion describes the behavior of the gases sorbed on coal.

SUMMARY

1. The sorption of gases on coal is due to a physical sorption process involving weak intermolecular forces. As a result, the following conclusions can be made.

   a. No chemical change occurs upon adsorpton or desorption; and the gas in the free and sorbed states are the same chemically distinct molecules.

   b. The molecules comprising the solid coal are also unchanged, retaining their chemical individuality, so the sorbed gas remains distinct and different from the solid coal material.

   c. There are physical differences between the free and sorbed gas which are analogous to those exhibited by water vapor and liquid water.

   d. The free and sorbed gas molecules exist in a dynamic equilibrium in which there is a constant interchange of molecules between the free and sorbed gas states, so there is not one specific gas

molecule or group of molecules which always reside in either the free or sorbed gas states.

2. On an industry-wide basis, the development and application of methods for measuring and recovering the sorbed gas are consistent with the physical sorption process and analogous to those used for conventional oil and gas reservoirs. Specifically, the following conclusions can be made.

   a. The equilibrium between the free and sorbed gas is given in terms of a reversible sorption isotherm; and in practice, the sorption isotherm has been found represent the gas-in-place and its recovery during simple pressure depletion.

   b. The presence of moisture results in a gas equilibrium among the free, sorbed, and dissolved states similar to that in conventional oil and gas reservoirs.

   c. The sorption of different pure gases and gas mixtures on coal is consistent with the physical sorption process and is analogous to the manner in which these gases behave in conventional oil and gas reservoirs.

3. Amoco Production Company's technology for exploration and production of the sorbed gas further emphasizes the separation of the sorbed gas from the solid coal, as given by the physical sorption process, and the similarity in behavior with the gas in conventional oil and gas reservoirs.

4. Based on the available information, it is my opinion that (1) the sorbed gas and the solid coal remain distinct and different during both adsorption and desorption and (2) the sorbed gas acts, in many ways, similar to the gas in a conventional oil and gas reservoir.

DISCUSSION

The behavior of the sorbed gas is described in terms of the physical sorption process, the equilibrium represented by the sorption isotherm, the recovery due to pressure depletion, and the presence of moisture, different pure gases, and gas mixtures.

Physical Sorption

The sorption process can be classified into two types, physical and chemical. These two types of sorption are sometimes referred to as physisorption and chemisorption, respectively.

The physical sorption process has been described in many works (Brunauer 1943, de Boer 1953, Trapnell 1955, Young and Crowell 1962, Ross and Olivier 1964, Crowell 1966, Gregg and Sing 1967, Gregg and Sing, 1982, Adamson 1990). Physical sorption is a process whereby gas molecules are held close to a surface at a concentration exceeding that of the free gas by weak van der Waals forces. These are not special forces but rather the same ones responsible for the condensation of a gas to a liquid. As such, gas sorption is described as a condensation of the free gas on a surface.

Physical sorption, like condensation, is a general process that occurs with any gas-solid system provided that the pressure and temperature are suitable. Because the forces are weak, the sorbed gas molecules and those of the surface are not chemically altered by the adsorption or desorption process. As a result, the sorbed gas molecules and those of the surface retain their distinct chemical identity. The free gas and sorbed gas consist of the same chemically distinct molecules but differ physically in a manner similar to the differences between water vapor and liquid water. The weak forces also mean that the sorbed gas can be easily removed by nothing more than reducing the free gas pressure.

Further, the free and sorbed gas exist in a dynamic equilibrium. The dynamic equilibrium refers to the constant interchange of the free and sorbed gas molecules, where on average the number of evaporating gas molecules are balanced by an equal number of condensing molecules. A similar situation occurs at every gas-liquid water surface. The typical residence time in the sorbed state is just a fraction of a second for conditions typical of physical sorption (de Boer 1953, Adamson 1990). The sorbed gas molecules are also mobile, having the ability to move about the surface (de Boer 1953).

In contrast to physical sorption, chemical sorption actually involves the formation of a chemical bond between the gas and surface molecules (Brunauer 1943, de Boer 1953, Trapnell 1955, Young and Crowell 1962, Crowell 1966, Gregg and Sing 1967, Adamson 1990). These bonds are ionic or covalent bonds formed between the electrons in the chemical and electronic properties of both the gas and surface molecules. In fact, it is possible for the gas molecule to actually dissociate upon adsorption. Due to these strong bonding forces, it takes much more energy than simple pressure reduction to cause the gas to desorb; and in some cases, a chemically different molecule will desorb from the one which was originally adsorbed. Chemical sorption is also a specific process occurring only between those molecules which can have chemical reaction and, therefore, form a chemical bond.

Based on these differences, several criteria can be used for distinguishing between physical and chemical sorption (Ruthven 1984). Basically, physical sorption has low heats of sorption—less than two to three times the latent heat of vaporization, while chemical sorption has high heats of sorption. In addition, physical sorption is rapid, reversible, and non-specific. Chemical sorption is just the opposite—slow, irreversible, and specific.

Many studies show that gas storage on coal is a physical sorption process. In the case of methane, several works

have shown that the heat of sorption is less than two to three times the heat of vaporization of methane (Zwietering and van Krevelen 1954, Moffat and Weale 1955, van der Sommen et al. 1955, Anderson et al. 1966, Ruppel et al. 1972, Ruppel et al. 1974, Yang and Saunders 1985). This is also true for nitrogen (Zwietering and van Krevelen 1954), hydrogen (Yang and Saunders 1985), and carbon dioxide (Stevenson et al. 1991) which demonstrates that the process is nonspecific. These results are summarized in Table 1.

The rapid attainment of equilibrium refers to the rate of sorption at the surface of a micropore and not to the rate of diffusion as gas moves through the microporous solid coal. Some diffusion is probably occurring in all experimental measurements. Still, equilibrium times of a few hours are very typical (Moffat and Weale 1955, van der Sommen et al. 1955, Jolly et al. 1968) indicating that equilibrium is quite rapid even though some diffusion is taking place.

There is also plenty of evidence that the process is reversible (van der Sommen et al. 1955, Gunther 1965, Daines 1968, Mavor et al. 1990). Reversible means that the adsorption and desorption curves are the same.

Adsorption refers to increasing sorption due to increasing free gas pressure, while desorption refers to decreasing sorption due to decreasing free gas pressure. Still, hysteresis or irreversible behavior has been reported by one study (Bell and Rakop 1986), but a later work (Mavor et al. 1991) found that the hysteresis was caused by experimental errors related to the change of moisture in the coal during measurement. As an example, the reversibility of methane sorption is shown in Figure 1 for a Fruitland coal sample from the San Juan Basin.

The fact that all four of the criteria are satisfied provides very strong evidence that methane and other gases are physically sorbed on coal.

Sorption Isotherm

The equilibrium between a free gas and its sorbed phase is expressed in terms of a sorption isotherm which gives the sorbed gas content as a function of the free gas pressure at a constant temperature. The Langmuir isotherm is commonly used for gas sorption on coal as well as many industrial and commercial sorbents. It is based upon a dynamic equilibrium between evaporation and condensation and is commonly determined from laboratory measured sorption data.

The production of sorbed gas involves a pressure reduction or desorption which is caused by a removal of gas and water from a coal seam. For a given pressure reduction, an amount of sorbed gas specified by the Langmuir isotherm is desorbed and becomes [Illegible] Verification of this process is given by laboratory experiments and demonstrations, by desorption of gas from field core samples, by downhole Treasures in producing wells, and by the gas rates and recovery from coal seams. This evidence reinforces that the sorbed gas is recoverd by nothing more than simple pressure depletion, and this pressure behavior of the sorbtion gas is totally consistent with the principles of physical sorption. Further, the Langmuir isotherm is used in a manner totally analogous to the way in which the real gas law is used for a conventional gas reservoir.

Moisture

In addition to sorbed gas, water moisture is also sorbed in the open microporosity or internal free volume of solid coal (Berkowitz, 1979). The sorbed water reduces the sorption of methane relative to the amount which could be sorbed on dry coal (Selden 1934, Gunther 1965, Daines 1968, Jolly et al. 1968, Patching 1970, Bell and Rakop 1986, Patching and Mikhal 1986, Mavor et al. 1990). At in situ conditions, coal is fully sorbed with water so the effect of moisture has already been realized.

The main implication is that laboratory measurements of gas sorption should use coal samples containing the sorbed moisture in order to be representative of in situ conditions (Joubert 1973, Joubert 1974).

Coals also contain water in a bulk form in the larger pores and natural fractures (Berkowitz, 1979). With the presence of bulk water, the equilibrium actually takes place among the gas dissolved or absorbed in the bulk water, the free gas, and the sorbed gas. When there is no free gas present, the equilibrium is just between the dissolved and sorbed gas states. The equilibrium between the gas dissolved or absorbed in the bulk water and the free gas is commonly given in terms of Henry's Law.

The presence of water is not unusual, since all conventional oil and gas reservoirs contain water (Levorsen 1967). In fact, gas sorption also occurs on the rocks of conventional oil and gas reservoirs, though to a much lesser degree than on coal. As a result, the same gas equilibrium among the dissolved, free, and sorbed states exists in all conventional oil and gas reservoirs.

Different Pure Gases

It is well known that different pure gases have different sorption capacities on coal (Gunther 1965, Patching 1970, Yang and Saunders 1985, Stevenson et al. 1991, Arri et al. 1992). As an example, the results for nitrogen, methane, and carbon dioxide are shown in Figure 2 for a Fruitland coal sample from the San Juan Basin. For common gases, the trend of increasing sorption capacity is hydrogen, nitrogen, methane, ethane, and carbon dioxide. This order is also one of increasing atmospheric pressure boiling point which provides further evidence that physical sorption is occurring. Physical sorption is governed by the same forces responsible for condensation of a gas to a liquid, and each pure gas has a different propensity for condensation or vaporization. This propensity is illustrated by the value of the atmospheric pressure boiling

point. Increasing boiling point means that more energy is required to cause vaporization indicating an increased preference for condensation and, therefore, a greater sorption capacity (Brunauer 1943, Ettinger et al. 1966). This difference in sorption capacity is not unique to coal, since these pure gases dissolve in the the oil of a conventional reservoir follow the same trend (Standing, 1951, Muskat, 1981).

Gas Mixtures

Like the gas in conventional reservoirs, the gas sorbed on coal is not always pure methane (Creedy and Pritchard 1983, Gould et al. 1987, Hanson 1990). In some cases, the coal contains appreciable amounts of carbon dioxide, nitrogen, and heavier hydrocarbons; and the composition of the gas sorbed on coal and that of the gas to conventional reservoirs can be quite similar. Further, the composition of gas in coal seams can be vary from location to location, as does the gas in conventional reservoirs (Scott et al. 1991).

The sorption of gas mixture on coal is consistent with the physical sorption process. As such, the behavior of sorbed gas mixtures is readily described using multicomponent models of physical sorption (Ruppel et al. 1972, Saunders et al. 1985, Stevenson et al. 1991, DeGance et al. 1992). The extended Langmuir isotherm is one of these models, and an example is shown in Figure 3 for methane-nitrogen sorption on a Fruitland coal sample from the San Juan Basin.

The difference in pure gas sorption capacities suggests that the less strongly sorbed methane might be produced in preference to the more strongly sorbed carbon dioxide and heavier hydrocarbons. Production data and reservoir modeling results suggest that the magnitude of the gas composition changes is small due to the limited pressure range over which depletion usually occurs (Hale and Firth 1988, Decker et al. 1988, Yee et al. 1991). These results

are similar to the behavior of the produced gas composition for a conventional gas condensate reservoir (Standing 1951, Muskat 1981).

Amoco Production Company's Technology

The principles and practices encompassed in Amoco Production Company's technology is consistent with that developed and used on an industry-wide basis. As such, it further reinforces (1) the separation of the sorbed gas from the solid coal, consistent with the principles of the physical sorption process, and (2) the similarity of the gas sorbed on coal with the gas in conventional oil and gas reservoirs. Specifically, Amoco Production Company's technology includes studies on the sorption of pure gases and their mixtures (Arri et al. 1992, DeGance et al. 1992, Yee et al. 1991, Yee et al. 1992), the modeling of gas storage and production (Seidle and Arri 1990, Seidle 1991, Yee et al. 1991), the measurement of coal seam permeability (Seidle et al. 1991), the enhanced recovery of sorbed gas (Puri and Yee 1990, Arri et al. 1992), and the use of coal seams for gas storage (Puri and Volz 1992). Many of these results are also presented in a summary of Amoco Production Company's research effort (Metcalfe et al. 1991).

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4-007

Application No. 3422

HOMESTEAD

Land Office at Durango, Colorado.

February 17th, 1906.

I, JOHN J. PATTERSON, *of* Durango, La Plata County, Colorado, *do hereby apply to enter, under Section 2289, Revised Statutes of the United States, the* E.½ SE.¼ Sec. 21 and the W.SW.¼ *of Section 22, in Township* 34 North *of Range* 9 W.N.M.P.M., *containing 160 acres.*

/s/ John J. Patterson

Land Office at Durango, Colorado

February 17th, 1906.

I, F.C. Perkins, REGISTER OF THE LAND OFFICE, do hereby certify that the above application is for Surveyed Lands of the class which the applicant is legally entitled to enter under Section 2289, Revised Statutes of the United States, and that there is no prior valid adverse right to the same.

/s/ F.C. Perkins
Register.

Favorable Report of
Charles W. Wells, Special Examiner,
in re H.E. No. 3422, Durango series,
John J. Patterson, Durango.

DEPARTMENT OF THE INTERIOR

GENERAL LAND OFFICE

Denver, Colorado, July 6th, 1908.

Honorable Commissioner,

General Land Office,

Washington, D. C.

Sir:—

Refering to your letter "P. 'A.F. McC,'" of June 14th, 1907, in which certain lands within withdrawn coal land areas, were sent to Division "P." for investigation, I have the honor to inform you that H.E. No. 3422, Durango series, F.C. No. 1108, John J. Patterson, Entryman, E.½ S.E.¼ Sec. 21, the W.½ of the S.W.¼ of Sec. 22, T.34 N. R.9 W. of the N.M.P.M. is included within the list of such entries.

On June 16th, 1908 I made an examination on the ground of the entry and beg leave to report as follows:—

The two groups of coal measures or veins common to this locality, each underlie this entry, the Laramie group of veins at a probable depth of from 1200 to 1500 feet below the surface, the saverda group of veins at a probable depth of 3200 to 4000 feet below the surface of the entry. The nearest exposed outcropping to the entry is on the N.W.¼ of Sec. 4, T.34 N.E.9 W. of the N.M.P.M it is across the Animas river from the entry, about 5 miles from the N.W. Cor. of the entry.

The entry is on a high mesa known as the lower Florida mesa, it can all be irrigated, and lies level and can all be

cultivated, the surface is covered with scrub pinon and cedar, and sage brush. About 20 acres has been cleared and is under cultivation at the present time, the entry is used by the entryman as a home, whose improvements are good, all the surroundings show good faith as being exhibited by the entryman, and go to show that he took the land for a home and not for and in the interest of anyone for the coal that underlies the land.

Owing to the great depth of the coal on this entry, and the long distance from any outcrop opening, it will be a great many years before this land will have any special value for the coal underlying it, and I do not think that the entryman took the land for any other purpose than that set out in his brief, being that of wanting it for a home.

I would recommend that the protest be withdrawn and providing the other evidence offered is sufficient, that the entry be allowed to proceed to patent.

Very Respectfully

/s/ Charles W. Wells
Special Examiner S.L.S.

Chief Field Div. M.D. McEniry.

Relative to favorable reports by Spl. Examiner Wells on agricultural entries in Tps. withdrawn as coal lands in Durango District.

DEPARTMENT OF THE INTERIOR
GENERAL LAND OFFICE

522 Quincy Bldg.,

Denver, Colo., July 31, 1908.

Honorable Commissioner,

General Land Office,

Washington, D. C.

During the first two weeks of this month Special Coal Examiner Charles W. Wells made thirty-two favorable reports on homestead and desert land entries in the Durango Land District, embracing lands situated on what are known as the Florida and Fort Lewis Mesas, south and southwest of the city of Durango.

The townships in which these lands are located have been withdrawn, and Tp. 34 N.½ R. 8 W., N.M.P.M., in which most of the entries referred to above are located, has been classified, as coal land. In the cases investigated, a list of which, with the entry numbers and descriptions of the lands, is appended hereto, the entrymen have made full compliance with the law as to residence and improvements, where the lands were taken up under the homestead act; where taken under the desert land law, the land has been reclaimed, and a large part of it is in cultivation. In many instances, the desert land claimants are actually residing and making their homes on the land.

These mesas are all underlaid with coal, and comprise part of the area known as the Durango coal fields. These

coal fields have been so thoroughly examined geologically, and prospected so much from a practical standpoint, that the coal areas have been established beyond peradventure. In one of his adverse reports, in describing this field, Special Examiner Wells states,

> "It has been fully determined and satisfactorily proven that wherever you find escarpments of the two coal measures, namely, the Mesaverde and Laramie measures, between the two escarpments you will find the Lewis shale, and below the Lewis shale you will find the Mesaverde coal measures at all places; that stratigraphically there is from 2000 to 2400 feet between the two coal measures; that the depth of the coal measures at any point between the escarpments will depend on the amount of distance stratigraphically that the point is below the bottom of the Laramie measure.
>
> "These facts are not only known to those familiar with the geology of the Durango field, but have become the common property of all."

I have been over part of these lands myself; and Special Agent Scott, now Chief fo the 11th Field Division, made a number of examinations of claims on this mesa, prior to his leaving here. His reports were along the same line as Special Examiner Wells', recommending the issuance of final certificate. In all of those reports I concurred in the recommendations.

The question naturally arises, however, as to where to draw the line between the bona fides of an entryman, as shown in these cases submitted, and the interests of the Government, in the enforcement of the law in holding lands exclusively for their coal values. In these cases we all believe that the entrymen took up the lands solely for agricultural purposes, with no thought of the coal values—at least, no thought of any present coal value of the land. When the time will come when the coal underlying these lands will be commercially valuable, in the sense that a ready market will be at hand for it, is problematic. Undoubtedly it will be at least ten, and perhaps thirty or forty years, before the Durango field will be worked to the extent that the Trinidad coal fields of this state are being worked at the present time.

At the same time, as stated before, there is no question that these lands are underlaid with valuable coal measures, and they lie at such a depth that they could be worked with profit at the present time. As stated in our reports on these entries, in a general way, I believe all the equities in the case seem to give the entrymen the perference and to insure him his title, by reason of what he has done to the surface of the land.

I do not feel satisfied, however, in recommending that these entries pass to patent on these favorable reports, even while endorsing the recommendations of the agents making the field investigations, without calling your particular attention to the entire group of cases, and presenting the cases in a more concrete form than the several reports referred to have done.

There will probably be quite a number of similar cases to be reported on in the future; and if consistent with the policy of the office, I respectfully request an expression from you on the recommendations made in the cases a list of which is attached hereto.

Very respectfully,

/s/ M. D. McEniry
Chief Field Division.

[List of Entries on Florida and
Fort Lewis Mesas Omitted]

September 9, 1908.

Honorable Commissioner:

This is a very difficult matter to determine in view of the strong equities of the homestead and desert entrymen who have possibly innocently spent their time and money in improving and developing these lands. At the same time I do not see how we are justified in passing the entries to patent in view of the statement made by Chief of Field Division McEniry and Examiner Wells, that these mesas are underlayed with coal, and their coal character has been so thoroughly established by expert examination and prospecting as to be commonly known in the vicinity. It is not necessary, as it contended on page 5 of the letter, that claimants should have personally known of the existence of the coal in order to preclude the disposition of the lands to them under the agricultural laws. If the coal character was a matter of common knowledge or was such that it was incumbent upon the entrymen to know it, it matters not whether they had actual knowledge of its existence or not, nor can we be governed by the statement that the coal at present has no market value because if the land does contain valuable deposits of coal it is not subject to disposition under other laws no matter what would be the distance from the market. The Department has so ruled in a timber and stone case, 34 L. D. 123.

I am inclined to think that we will have to proceed against the entries but hope that before final action shall have been taken thereon, Congress will have passed a bill which will enable us to dispose of the surface to the entrymen, reserved.

/s/ [Illegible]
Law Clerk

DEPARTMENT OF THE INTERIOR
GENERAL LAND OFFICE.
WASHINGTON, D. C.

Sept. 22, 1908.

Reports submitted [Illegible] warrant
adverse proceedings

Mr. M. D. McEniry,

Chief of Field Division,

Denver, Colorado.

Sir:

The office is in receipt of your report dated July 31, 1908, in which you draw attention to 32 favorable reports made by special Examiner Charles W. Wells, during the early part of July, on homestead and desert land entries in the Durango land district, embracing lands situated on what are known as the Florida and the Ft. Lewis mesas. You state that the townships in which these lands are located have been withdrawn and township 34 N., R. 8 W., N. M. P. M., in which 6 of the entries referred to are located, has been classified as coal in character. You append a list of the entries reported upon by Examiner Wells, and state that the entrymen have made full compliance with the law as to residence and improvements, where the lands were taken up under the homestead act, and where taken up under the desert-land law, the land has been reclaimed and a large part of it in cultivation, and that many of the desert-land claimant are actually residing and making their homes on the land.

These mesas, you state, are all underlaid with coal, and comprise part of what is known as the Durango coal field; that these coal fields have been so thoroughly examined, geologically, and prospected so thoroughly, from a practical standpoint, that the coal areas have been established

beyond peradventure. You quote from an adverse report made by Examiner Wells, in describing this field as follows:

> "It has been fully determined and satisfactorily proved that wherever you find escarpements of the two coal measures, namely, the Mesaverde and the Larimer measures, between the two escarpements, you will find the Lewis shale, and below the Lewis shale you will find the Mesaverde coal measures at all places; that, stratigraphically, there is from 2000 feet to 2400 feet between the two coal measures; that the depth of the coal measures at any point between the escarpements, will depend upon the amount of distance, stratigraphically, that the point is below the bottom of the Larimer measures. These facts are not only known to those familiar with the geology of the Durango field, but have become the common property of all."

You state that you have been over part of these lands yourself; and that Special Agent Scott (new chief of the 11th field division), made a number of examinations of the claims on this mesa, prior to his leaving Colorado, and that his reports were along the same lines as Special Examiner Wells, recommending the issuance of final certificate, and that in all of these reports you concurred in the recommendation.

You request to be informed as to where to draw the line between the bona fides of an entryman, as shown in these cases submitted, and the interests of the government in the enforcement of the law in holding lands exclusively for their coal values. You state that in these cases you fully believe that the entryman took up the land solely for agricultural purposes, with no thought of the coal value, at least as thought of any present coal value of the land; that when the time will come when the coal underlying these lands will be commercially valuable in the sense that a ready market will be at hand for it, is

problematic, and that it undoubtedly will be at least 10, and perhaps 30 or 40 years before this Durango field will be worked to the extent that the Trinidad coal field is being worked at the present time.

You further add that you do not feel satisfied in recommending that these entries pass to patent on these favorable reports, even while endorsing the recommendations of the agent making the field investigations, without calling particular attention to the entire group of cases, and presenting the cases in a more concrete form than the several reports referred to have done.

All of the entires enumerated in the list accompanying your report have been drawn to this division and a careful examination has been made of them, and of the reports submitted upon them by Special Examiner Wells. It is observed that, in story, the final certificate has issued or final proof has been submitted.

A fair sample of the reports submitted by Examiner Wells in these cases is his report, dated July 13, 1908, cash entry No. 2:13, of John F. McCoy, Vincent, Colorado, embracing the E. ½ of SW. ¼, Sec. 10; E. ½ W. ¼, Sec. 15; L. 34 N, [Illegible] 12 ¼., N. M. P. M., wherein he states that the lower measures of the coal veins common to the locality underlie this entry at a probable depth of from 150 to 300 feet; that the nearest outcropping to the north appears near the center of Sec. 34, T. 35 N., R. 12 W., —a distance of 4 miles; the nearest outcropping to the northwest, is in the NE. 1, Sec. 5, T. 34 N., R. 12 W., —a distance of 6 miles; that there is also an outcropping 6 miles southeast from the entry; that this entry is on the formation known as the Lewis shale; and there is nothing on or in the vicinity of it that would indicate to a layman that it was above coal measures.

His report further shows that the principal part of the land was covered, originally, with a very rank growth of sage brush; that the portion extending under the slope of

a hill is covered with a scrubby growth of cedar, and a few scrub pinion pines; that the improvements consist of a farm house worth from $500 to $600; milk house and cellar, rock, worth $100, a grain house worth $50; together with a good stable and corrals; 100 acres is enclosed with a hog tight-wire fence; fifty acres are under for cultivation, plenty of water has been secured to irrigate all the tillable land. A good system of ditches has been constructed to place water on the land suitable for cultivation; the land suitable for cultivation is of a very high-class bottom sage brush land; and the agent considers the entire entry, with the improvements and water rights, to be worth in the neighborhood of $5000; which is practically $50 per acre. The agent adds that he considers that the law pertaining to homestead entries has been fully complied with, and that entryman took the land for a home for himself and family.

The field examinations in these cases were made after the claimants had offered their final proofs, but the facts reported by the special agent existed and were known to exist at and prior to submission of final proof. It is not a question as to whether entryman had actual notice of the existence of coal or not, nor is it necessary to show that the government or its agent had, prior to final proof, actual knowledge of the existence of this deposit. The rule is that if the valuable mineral or coal is known to exist, the land is not subject to agricultural disposition; as, for instance, it may be known to a contestant who may establish that fact by means of proof, and thus secure the cancellation of the entry, although the entryman may have no actual knowledge of its existence or it may be as in these cases, i. e., the geological formation of the land involved and the surrounding lands, and discoveries and developments upon other in the locality, are such as to charge people generally with a knowledge of the coal character thereof, although a particular entryman might not have had actual knowledge of these conditions.

It was a matter of common knowledge with which these entrymen must be presumed to be charged. Any other holding than this would render the government powerless to control the proper disposition of its lands, and it should not have imposed upon it the burden of bringing to every claimant who enters upon public lands, actual knowledge as to their character.

This geological condition existed prior to the original settlement upon these land; and it is, therefore, not a question of discoveries made after final proof, but is simply the estabilshing by proof of the fact that this condition existed prior to proof.

The reports in these cases, establishing the coal character of the tracts, warrant adverse proceedings against the entries. Each case will be taken up in due course of business and proceedings directed charging the lands to be coal in character and known to be such at and before the submission of proof.

Very respectfully,

/s/ [Illegible]
Commissioner.

DEPARTMENT OF THE INTERIOR

NOTICE OF RIGHT OF ELECTION
(Act March 3, 1909)

U. S. LAND OFFICE, No. 02072

May 17, 1909.

John J. Patterson,
Durango, Colorado.

Sir:

Your attention is directed to the provisions of the Act of March 3, 1909, on the back hereof, and you are hereby allowed sixty days from notice within which to file in this office your election to take patent for the lands embraced in your location, selection, or entry, Number 3422, made July 2, 1906, for E½SE¼ Sec. 21, and W½SW¼, Section 22, Township 34N, Range 9 W, New Mexico Principal Meridian, such patent to reserve to the United States all coal in the lands with the right of the United States, or persons authorized by it, to prospect for, mine, and remove coal from the same upon compliance with the conditions of and subject to the limitations of said act; or to deny the existence of known deposits of valuable coal upon the land at date of final proof and entry, in which event you must file in this office within the time prescribed, evidence in the form of affidavit statements by persons familiar with the lands, preferably mineral experts or practical miners, alleging the lands to be noncoal in character, with the reasons therefor. If you fail to within sixty days from receipt of this notice file your said election, or to deny the existence of known deposits of valuable coal in the land, patent will issue on submission of final

proof satisfactory in other respects, reserving to the United States all the coal in the land.

Respectfully,

/s/ G. H. Charlton, Register

/s/ D. H. Sheets, Receiver

Election to Receive Patent upon Nonmineral Claim Exclusive of any Deposits of Coal in the Land.

State of Colorado)
) ss:
County of La Plata)

County of La Plata, State of Colorado

[Illegible]

No. 3422, for the E½SE¼ Sec. 21, and W½SW¼, Section 22, Township 34 N, Range 9 W, New Mexico Principal Meridian, being duly sworn, do hereby ELECT, upon submission of satisfactory proof of compliance with law under which my claim was initiated, to receive patent for the lands, which patent shall reserve to the United States all of the coal in said lands with the right of the United States, or any person authorized by it, to prospect for, mine, and remove the coal from same in accordance with the conditions and limitations of the Act of March 3, 1909, Public No. 323.

In accordance with above election, I hereby authorize the proper officer or officers of the United States, upon submission of satisfactory final proof upon my location, selection, or entry, to issue final certificate or other paper as basis for patent, containing the reservation of the coal hereinbefore described, and to issue patent in accordance therewith.

/s/ John J. Patterson

I HEREBY CERTIFY that the foregoing affidavit was read to or by affiant in my presence before affiant affixed signature thereto; that affiant is to me personally (known or has been satisfactorily identified before me by .....);

(Give full name and post-office address)

and that said affidavit was duly subscribed and sworn to before me at my office in Durango, Colorado, this tenth day of May, 1909.

/s/ G. H. Charlton, Register
(official description of officer)

Note 1. This affidavit of election may be executed before any officer authorized to administer oaths and possessesed of a seal.

Note 2. The attention of parties in interest is directed to the provisions of the Act of March 3, 1909, copy of which is printed below.

[PUBLIC—No. 323]
[H. R. 24834]

An Act For the protection of the surface rights of entryman.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That any person who has in good faith located, selected, or entered under the nonmineral land laws of the United States any lands which subsequently are classified, claimed, or reported as being valuable for coal, may, if he shall so elect, and upon making satisfactory proof of compliance with the laws under which such lands are claimed, receive a patent therefor, which shall contain a reservation to the United States of all coal in said lands, and the right to prospect for, mine, and remove the same. The coal deposits in such lands shall be subject to disposal by the United States in accordance with the provisions of the coal-land laws in force at the time of such disposal, but no person shall enter upon said lands to prospect for, or mine and remove coal therefrom, without previous consent of the owner under such patent, except upon such conditions as to security for and payment of all damages to such owner caused thereby as may be determined by a court of competent jurisdiction: *Provided,* That the owner under such patent shall have the right to mine coal for use on the land for domestic purposes prior to the disposal by the United States of the coal deposit: *Provided further,* That nothing herein contained shall be held to affect or abridge the right of any locator, selector, or entryman to a hearing for the purpose of determining the character of the land located, selected, or entered by him. Such locator, selector or entryman who has heretofore made or shall hereafter make final proof showing good faith and satisfactory compliance with the law under which his land is claimed shall be entitled to a patent without reservation unless at the time of such final proof and entry it shall be shown that the land is chiefly valuable for coal.

Approved March 3, 1909.

Durango H.E. 3422

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D.C. June 30, 1909

Register and Receiver

Durango, Colorado

Sir:

On July 2, 1906, John J. Patterson made H.E. 3422, your services for the E½SE¼ Sec.21 and W½SW¼ Sec.22, T.34 N., R. 9 W., E.M.T.M., upon which homestead final certificate No. 1103 issued March 22, 1907. The entryman, on December 7, 1901, made H.E. 2372 for the same lands, and this second H.E.—No. 3422—was allowed by letter "I" of May 18, 1906. This township has been withdrawn on that land but not classified.

On July 6, 1908, Special Examiner Charles W. Wells submitted a report in this case, alleging that the land contains workable beds of coal.

Since it appears that the entryman has complied with the homestead laws as to residence and cultivation, and that the value of the land for its coal contents is the only charge against the entry, you are directed to notify entryman that he will be allowed 50 days from notice within which to file in your office his electing to take patent for the land exclusive of the coal deposits contained therein, or to deny that the land contains work-pile deposits of coal and request hearing to determine that question. You will issue such notice and proceed with the case in accordance with the provisions of the Act of March 3, 1909, and the instructions [Illegible] of March 25, 1909. (See also circular of April 27, 1909.)

The record appears satisfactory and complete. If entryman shall elect to take patent for the land reserving all the coal contained therein to the United States, or if, after

having actually received notice, he shall fail to take any action, the entry will be passed to patent, said patent containing reservation, conditions and limitations of the act of March 3, 1909 (Public No. 323).

In due time submit report to this office.

Very respectfully,

/s/ Fred Damnett
Commissioner.

WWG

(Copy to Chief F.D.)

4-400-1yr.

THE UNITED STATES OF AMERICA
(RECORD OF PATENT)

TO ALL WHOM THESE PRESENTS SHALL COME.
GREETING:

Durango 02072.

Homestead Certificate No.

Application

WHEREAS, There has been deposited in the GENERAL LAND OFFICE of the United States a Certificate of the Register or the Land Office at Durango, Colorado, whereby it appears that, pursuant to the Act of Congress approved 20th May, 1862, "To secure Homesteads to Actual Settlers on the Public Domain," and the acts supplemental thereto, the claim of

JOHN J. PATTERSON

has been established and duly consummated, in conformity to law, for the east half of the southeast quarter of Section twenty-one and the west half of the southwest quarter of Section twenty-two in Township thirty-four north of Range nine west of the New Mexico Meridian, Colorado, containing one hundred sixty acres, according to the Official Plat of the Survey of the said Land, returned to the GENERAL LAND OFFICE by the Surveyor General:

NOW KNOW YE, That there is, therefore, granted by the UNITED STATES unto the said John J. Patterson the tract of Land above described: TO HAVE AND TO HOLD the said tract of Land, with the appurtenances thereof, unto the said John J. Patterson and to his heirs and assigns forever; subject to any vested and accrued water rights for mining, agricultural, manufacturing, or other purposes, and rights to ditches and reservoirs used

in connection with such water rights, as may be recognized and acknowledged by the local customs, laws, and decisions of courts, and also subject to the right of the proprietor of a vein or lode to extract and remove his ore therefrom, should the same be found to penetrate or intersect the premises hereby granted, as provided by law. And there is reserved from the lands hereby granted, a right of way thereon for ditches or canals constructed by the authority of the United States.

Reserving, however, to the United States all coal in the lands so entered, and to it, or persons authorized by it, the right to prospect for, mine, and remove coal from the same upon compliance with the conditions of and subject to the limitations of the Act of March 3, 1909 (Public No. 323).

IN TESTIMONY WHEREOF, I, William H. Taft, President of the United States of America, have caused these letters to be made Patent, and the seal of the General Land Office to be hereunto affixed.

[Seal]

GIVEN under my hand, at the City of Washington, the Sixth day of DECEMBER, in the year of our Lord, one thousand nine hundred and nine, and of the Independence of the United States the one hundred and THIRTY-FOURTH.

By the President:

/s/ Wm. H. Taft

By /s/ M. W. Young
Secretary.

/s/ [Illegible]
Recorder of the
General Land Office.

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF COLORADO

Case No. 91-B-2273

SOUTHERN UTE INDIAN TRIBE,
Plaintiff,

v.

AMOCO PRODUCTION COMPANY, *et al.*,
Defendants.

AFFIDAVIT OF STEPHEN L. BEND

Stephen L. Bend, being duly sworn, deposes and says:

1.1 My name is Stephen L. Bend. I am employed by the University of Regina, Canada, as an assistant professor and research scientist in the Department of Geology. I reside at 146 Laubach Crescent, Regina, Saskatchewan, Canada.

1.2 I am an organic geochemist and an organic petrologist. I possess a wide range of skills within these two related disciplines, coupled with a range of interests that extend from basin evaluation, the characterization of petroleum source materials and related products, to various aspects of coal science. I have a PhD and MSc specifically related to these areas.

1.3 I have previously been employed as an organic geochemist by Exploration Logging Canada. In addition, I have been a petroleum logging geologist for Exploration Logging Overseas, Ltd. A copy of my resume is attached as Exhibit 1.

1.4 I have been retained by the Southern Ute Indian Tribe to describe the aspects of coal composition, formation and characterization, as related to the mode of occurrence of coalbed methane.

2.1 Coal has remained a significant industrial and economic commodity for hundreds of years, both as a fuel and as an industrial feedstock. Coal is a multi-purpose resource that has many uses besides being burned as a solid fuel.

2.2 Coal represents an easily recognizable natural substance, however it is not homogeneous.

2.3 Coal can vary greatly in its properties and suitability for a given application. The chemical and physical properties of coal are also highly variable.

2.4 Coal is a complex heterogeneous material and a system of associated entities.

2.5. Coal is a heterogeneous carbonaceous substance comprised of macerals, water, gases, oil-like bitumen, elements and trace elements. Coal contains constituents that are clearly not solid (i.e., liquids, gases), it also contains materials that exhibit a fluid-like or plastic behavior (e.g. bitumen, the maceral exudatinite) under normal geological conditions, and material (e.g. calcium, sodium) that may be exchanged.

2.6 Coal as an entity is a sedimentary rock, unlike kerogen which represents relatively minor amounts of organic material disseminated throughout a host rock. The relative proportion of organic to inorganic material differentiates what is coal as an economic entity and what is organic-rich carbonate or clastic rock.

3.1 The formation of coal occurs over many millions of years. The process commences with the formation, accumulation and preservation of plant and organic material in an aquatic environment. Upon death, such plant and organic material may be partially or completely decomposed and incorporated within peat.

3.2 Coal is derived from peat. Peat has long been recognized as the principal precursor of all humic coals.

Peat is largely comprised of water. It is not possible to have a complete and meaningful definition of peat without reference to its moisture content. Peat represents the culmination of organic detritus, formed predominantly from plant material, with minor amounts of inorganic mineral material. Many inherent properties within coal (e.g. maceral composition) are ultimately derived from the processes that take place during the formation of peat, and therefore peat is the starting point of coal.

3.3 The accumulation of peat in a gently subsiding aquatic environment is considered a necessary prerequisite to the formation of coal. The development of a peat-forming environment requires unique conditions. Peat forming environments generally are referred to as swamps, mires, or marshes, including all those water-logged environments that form a habitat for aborescent and herbaceous plant species in which there is a net accumulation of organic plant detritus. There are two models that are currently considered to represent a peat-forming environment, they are the "delta" and the "raised ombrogeneous bog." These models share two important features that render them distinct from the laccustrine or marine depositional environments that are typically associated with the accumulation of potential petroleum source rocks. Firstly, humic coals are deposited within an oxic to suboxic environment, whereas the deposition of kerogen precursor material requires a suboxic to anoxic environment. The circulation of oxygen bearing water through a fine-grained sediment that contains disseminated organic matter effectively promotes the degradation and removal of that organic material by scavenging organisms. Second, coal is formed *insitu* predominantly from autochthonous material, whereas the formation and accumulation of petroleum in exploitable amounts typically involves the migration of material from a fine-grained clastic source rock to the reservoir.

3.4 Coalification represents the natural chemical and physical transformation of peat into coal, firstly by the

biochemical processes of peatification, and subsequently by geochemical processes over geological time (i.e. millions of years).

4. *Coal Macerals.* The internationally recognized terms for the three coal maceral groups are vitrinite, liptinite (exinite) and inertinite. Their respective macerals and origins are given in Table A.

4.1 The vitrinite group includes those microscopically distinct entities that correspond to the macroscopic bright bands in a hand specimen of coal (i.e. vitrain), and represents the predominant macerals in coal, those which form the coal matrix. The vitrinite group includes those macerals that are considered to have been derived from the humins of trunks, branches, stems, leaves and roots of vascular plants. The maceral telenite, for example, is identified on the basis of morphology (i.e. cell-structure) and color in reflected light.

4.2 Liptinites are largely grouped on the basis of specific optical and chemical properties (e.g. auto-fluorescence, a high hydrogen and low oxygen content) rather than origin. Some liptinites represent the "exines" of plant organs, some represent the bodies of once living algae, and some liptinites are generated during the process of coalification and do not exist within either peat or lignite. Exudatinite represent the movement and concentration of newly generated material within the cleats and cracks of coal, whereas fluorinite represents small blebs and globules of oil-like material. The maceral bituminite, in contrast, is considered to be the metabolic by-product of bacteria. Above the rank of medium volatile bituminous, liptinites are often optically indistinct from the vitrinite ground mass in reflected light, unless special techniques are utilized, such as etching.

4.3 The term inertinite was originally chosen to describe the infusible nature of certain highly reflecting macerals during carbonization, thereby incorporating the

macerals fusinite, semi-fusinite, micrinite, macrinite, sclerotinite and inertodetrinite on the dual basis of morphology and a technological property.

4.4 The analogy between coal macerals and rock minerals is very misleading. Rock forming minerals by definition are naturally occurring inorganic substances that possess an orderly internal structure and a characteristic chemical composition. They are crystalline, and have definite physical properties. In contrast, those microscopically distinct entities termed coal macerals do not possess a recognizable crystal form or even a resolved molecular structure. They are essentially non-crystalline. They do not possess a structure consisting of atoms, ions or molecules in a regular, repeating pattern typical of a crystalline substance. Analysis of certain aspects of maceral chemistry reveal that there are variations within the same variety of maceral, variations that underline the chemical diversity of the original plant species or distinct phases in the life-cycle of the precursor organism. Individual submacerals, macerals and maceral groups are typically recognized by their morphology, botanical affinity, optical properties or technological property. *See* Table A.

TABLE A

MACERAL GROUP	MACERAL	ORIGIN
Vitrinite	Telinite	Humified plant remains typically derived from woody, leaf or root tissue with well to poorly preserved cell structures
	Colinite	Humified material showing no trace of cellular structure
	Vtirodetrinite	Humified attrital or less commonly detrital plant tissue with particles typically being cell fragments
Liptinite (exinite)	Sporinite	Outer casing of spores and pollens
	Cutinite	Outer waxy coating from leaves, roots and some related tissues
	Resinite	Resin in-tilling of cells and ducts in wood resinous exvdations from damaged wood
	Fluorinite	Essential oils in part: some fluorinite may be produced during physically chemical coalification and represent non-migrated petroleum
	Suberinite	Cork cell and related tissues
	Bituminite	Uncertain. possibly algal or bacterial origin
	Alginite	Tests of some groups of green algae: material referred to alginite shows moderate to strong fluorescence
	Exudatinite	Veins of bitumen-related material expelled from organic matter during coalification
	Laptodetrinite	Detrial forms of liptinite that cannot be differentiated
Inertinite	Fusinite	Fusinite originates from wood and leaf tissue oxidation
	Semifusinite	Wood or leaf tissue weakly altered by mouldering or by biochemical alteration
	Inertodetrinite	Similar to fusinite or semifusinite but occurring as small fragments
	Macrinite	Humic tissue probably first gelified and then oxidized by processes similar to those producing semifusinite
	Scierotinite	Moderately reflecting tissue of fungal origin, largely restricted to Tertiary coals
	Micrinite	Largely of secondary origin formed by disproportionation of lipid or lipid-like compounds

5.1 Coal is defined, characterized and classified according to its moisture content, inorganic and organic content and utilization characteristics (e.g. coking propensity). There are two internationally recognized terms that specifically provide the means to describe the quality of a coal with respect to the organic (i.e. petrographic) and inorganic fractions of coal. They are coal *type* (indicating the maceral composition) and coal *grade* (indicating mineral content), respectively. Such considerations of coal quality are embodied within the United Nations sanctioned Economic Commission for Europe "Hard Coal Codification System." In contrast, most domestic schemes, such as the ASTM Classification of Coal by Rank, are based upon one or two modes of analysis, are simplistic and hierarchical, and were originally designed to specifically reflect the needs of a domestic market, a domestic supply of coal and usage (i.e. empirical). In short, such means of characterization were technology based, typically the production of metallurgical coke. To maintain a degree of standardization in the analysis of a highly variable substance such as coal, the ASTM published detailed guidelines and procedures regarding the analysis of coal (e.g. ASTM D1412-75 "Proximate Analysis"). Proximate analysis provides a measure of the relative volatile and non-volatile organic fractions, inherent moisture and non-combustible material within coal, obtained by either the thermal distillation or the combustion of coal. "Fixed carbon" is not measured directly, but represents the difference in an air dried coal between the sum of the moisture, volatile matter, ash content and 100 percent.

5.2 Equilibrium moisture, moisture-holding capacity, bed moisture and inherent moisture are all synonyms to describe the moisture content of the undisturbed coal in a coal seam. The moisture within coal is considered to be retained as either: superficial water or bulk water which may be present in cracks, capillaries, and large pores; physically absorbed water which is held in small

micropores; and chemisobed water. Moisture, volatile material and fixed carbon have been traditionally used as indices of rank (the level of coalification attained by coal), especially for low ranked coals (i.e. lignite), whereas volatile matter and fixed carbon are used for coals of higher rank (i.e. medium volatile bituminous). Even if moisture is not portrayed as a rank parameter, the derived value as representing moisture are used to standardize and normalize those values pertaining to volatile matter and fixed carbon.

5.3 Volatile matter represents bulk weight loss, corrected by moisture, when the coal is heated in specific apparatus under standardized conditions. The volatile matter evolved during heating includes gases and thermally distilled tar, the proportion of which has been showed to vary with coal rank.

5.4 Fixed carbon is considered to be the carbonaceous material remaining in the sample after the expulsion of moisture and volatile material and is obtained by difference. However, the term "fixed carbon" is an unfortunate misnomer because the term implies the existence of an entity within coal that has chemical meaning. Because the value represented "fixed carbon" is largely dependent upon volatile matter content, which itself varies depending upon experimental conditions, the proportion of carbon remaining in the sample cannot be truly regarded as fixed or finite.

5.5 The inorganic fraction of coal, as mined, exists as mineral matter, elements and trace elements. The term ash and mineral matter content are not interchangeable. Ash represents the residue that remains following the complete combustion of all organic materials under standardized conditions and consists of oxides and sulfates.

6. Coal is not a polymeric substance. Coal is a complex, heterogeneous, non-crystalline material, with an unknown molecular structure of extremely high molecular

weight. Considering the heterogeneous and highly variable nature of coal, attempts to represent such a heterogeneous material by modeling a single average coal molecule necessarily oversimplifies the structure of coal.

7.1 A useful approach to conceptualizing the structure of coal is to view it as consisting of two phases. One phase of coal structure consists of the macromolecular matrix. This phase consists of very large and complex molecules that form a matrix or network. Within this matrix are spaces or voids. The other phase of coal structure consists of smaller molecules which are entrapped or held within the spaces and voids of the macromolecular matrix. This phase is often labeled the "mobile phase." An illustration of this two-phase concept of coal structure is depicted in Figure One.

Two-component system:

- Macromolecular three-dimensional cross-linked network (immobile phase)
- Multitude of relatively small molecules with varying structures embedded therein (mobile phase, 10-50% share)

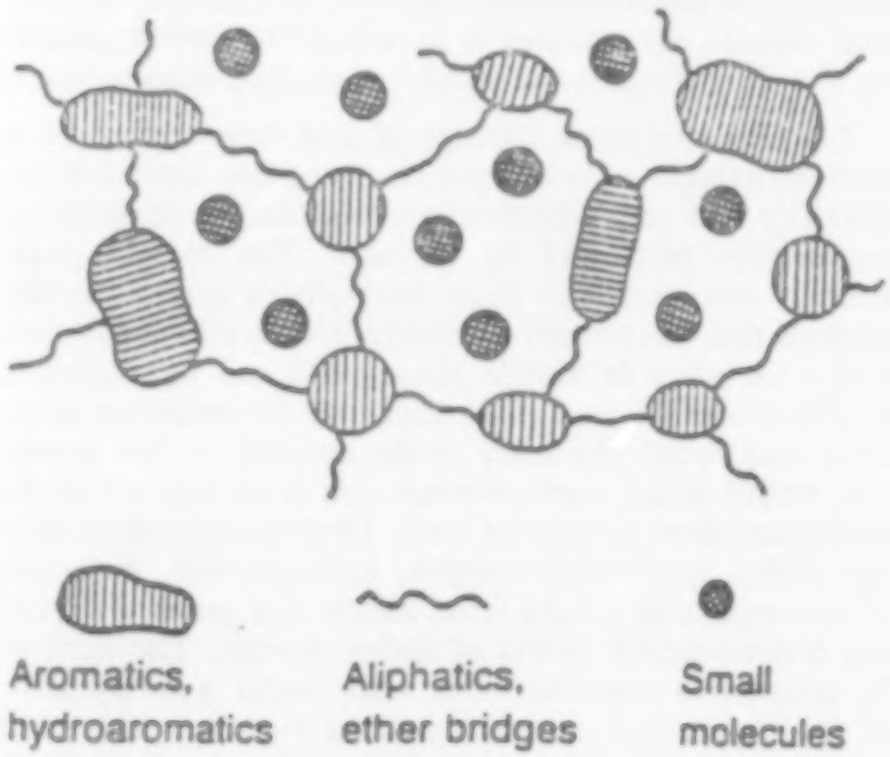

FIGURE ONE

7.2 Some of the molecules comprising the mobile phase are physically entrapped within the macromolecular matrix. Examples of such molecules would be medium weight hydrocarbons or "oils." These molecules are large enough that they become physically intertwined in the macromolecular matrix. Another example of molecules which form part of the mobile phase would be lighter molecular weight hydrocarbons or "gases." These molecules are retained on the surfaces of the macromolecular matrix.

7.3 In untreated coals, only a portion of the mobile phase is readily extractable with common organic solvents, but following treatment with coal-swelling solvents (e.g. pyridine) the yield of extractable material increases markedly. Thus, part of the mobile phase is physically trapped and the remainder is loosely bonded to the maceral molecular network. In contrast, the greater proportion of coal, the macromolecular network, is insoluble in common organic solvents and is considered to consist primarily of a three dimensional, cross-linked, molecular network.

7.4 The two phase concept of coal structure has been used to explain auto-florescence properties, coal thermoplasticity and coal oxidation and weathering phenomena, particularly pertaining to vitrinite. The mobile phase strongly correspor[illegible] to those thermally extractable hydrocarbons that are [illegible]ed by natural coalification processes, and a variation in [illegible]obile phase yield can be attributed to differences in coal rank, coal type or oxidation state. That coal could physically retain material of low molecular weight is not a new concept, and is reminiscent of the molecular sieve concept of coal. Organic solvents possess the ability to dislodge trapped, hydrogen-rich, molecules of low molecular weight from within coal pores, by forming donor-acceptor bonds of higher energy. The increase in extractable material when coal swells with pyridine, or the higher than expected yield of n-alkanes after mild pre-heating suggests the physical occlusion of material, or clathration, within the maceral molecular network of coal. That methane possesses the ability to participate in the clathrated structure is evidenced by the existence of methane hydrates, in which methane and other light hydrocarbon gases are retained within the three dimensional structure of ice.

7.5 The inorganic fraction of coal consists of minerals, elements, and trace elements. Minerals may occur within coal as small, disseminated granular inclusions, as lenses or layers (known as partings), as concretions or

nodules, cleat or fissure infillings, or as large masses of rock. In contrast, elements and trace elements are either physically trapped or chemically-bonded by the organic fraction of coal. Peat is a highly efficient trapping medium, capable of either physically or chemically trapping inorganic material, and a relationship exists between the type and concentration of some of the inorganics within peat (and hence coal) and the characteristics of the peat-forming environment.

FURTHER affiant sayeth naught.

/s/ Stephen L. Bend
STEPHEN L. BEND

[Notary omitted]

EXHIBIT ONE

Curriculum Vitae

Stephen Leonard Bend

146 Laubach Crescent
Regina
Saskatchewan
Canada
S4S 6M3

telephone (306) 584-5709

Vocational Perspective

I consider myself to be an Organic Geochemist and an Organic Petrologist, a person who possess a wide range of skills within those two related disciplines, coupled with a range of interests that extend from basin evaluation, the characterisation of source rock and related products to aspects of coal science. A broad industrial experience is supplemented and complimented by both a MSc and PhD related specifically to those areas. A solid understanding of microscopy is demonstrated through the design and construction of an eyepiece digital display unit (UK patent applied for).

Education

Doctor of Philosophy Degree

University of Newcastle upon Tyne, UK. 1986-1989

Thesis:

'Coal Characterization and Combustion Efficiency'

Supervisor:

Professor H. Marsh

Outline:

The thesis investigates the merits of using petrographic techniques, in conjunction with more traditional methods, when seeking to characterise coal feed stock for use in pulverised fuel combustion. Significant aspects of the work includes the investigation of oxidation phenomenon upon maceral fluorescence, which was included in a recent *International Energy Agency Review* (Morrison, 1990), and the recognition of several causal links between aspects of the molecular structure of coal and the nature of the pyrolysate product and char.

Master of Science Degree

University of Newcastle upon Tyne, UK., 1985-1986

Subject:

Organic Petrology and Organic Geochemistry

Dissertation:

'The Hydrous Pyrolysis of Fossil Resin'

Supervisor:

Dr. M. Fowler and Professor D. G. Murchison

Outline:

The MSc Advanced Course provided an understanding of the principles of organic patrology and the organic geochemistry of coals, oil shale, bitumen, oils and kerogen. The Dissertation discusses the hydrocarbon generating potential of fossil and modern remains using the technique of *hydrous pyrolysis,* which simulates the generation of hydrocarbons under natural conditions. The analysis of generated products and source materials was achieved by using elemental analysis, gas chromatography (g.c.), g.c.-mass spectroscopy and ultra-violet light microcopy. Results suggest that resinite may generate hydrocarbons at relatively low levels of thermal maturity.

Bachelor Degree (Hons)

University of Keele, U.K., 1974-1978

Subjects:

Geology and Geography (Joint Honours)

Subsidiaries:

Geochemistry and History

Outline:

The geology course consisted of the following broad subject areas: Principles of optical microscopy and optical mineralogy, igneous and metamorphic petroleum sedimentary petrology structural geology, palaeontology, stratigraphy, economic geology, inorganic geochemistry, field excursions to Norway and Western Scotland, and an individual mapping project (Malvern Hills).

College and Secondary School

Clarendon College, Nottingham, UK., 1971-1974
Brown Rigg Boarding School, Northumberland, UK., 1965-1971

Employment Record

March 1990-present

Assistant Professor and Research Scientist: Department of Geology, University of Regina, Canada. I was appointed as an Assistant Professor to the Department of Geology in February 1990 and specifically hired as an Organic Geochemist and Organic Petrologist. I have taught the undergraduate courses in *Organic Geochemistry and Organic Petrology* (the only one offered in Canada), *Petroleum Geology, Palaeontology* and *Introductory Geology.* I have also taught the following graduate level courses: *Recent Advances in Geochemistry* and *Current Problems in Organic Petrology.* I am presently supervising a Masters Student and I have assisted in the training of a former Doctorate student.

June 1984-September 1985

Organic Geochemist: Employed by *Exploration Logging Canada.* I was requested by Exporation Logging Canada to create an *Organic Geochemistry Laboratory* based in Halifax, Nova Scotia. I was responsible for recruiting, training and supervising a staff of three technicians for the purpose of conducting rapid source-rock evaluation using the 'Rock-eval', Total Organic Carbon (Leco), gas chromatographic and pyrolysis-gas chromatographic techniques. My developing interest in Organic Geochemistry, during this time, prompted my return to higher education in 1985.

January 1979-June 1984

Petroleum Logging Geologist: Employed by *Exploration Logging Overseas Ltd.* I joined *Exploration Logging Overseas Ltd.*, in January 1979, as a *Mudlogging Geologist/Wellsite Geologist* and spent over five years working either off-shore or on-shore in the Oil and Gas Exploration Industry.

Initial experience was gained in the *Beryl Oil Field, North Sea,* and in the *Gulf of Suez, Egypt.* My first independent assignment was for Mobil, and later for Exxon, in the *Giajiura Peninsular, Columbia.* Both assignments rendered excellent personal experiences, forcing me to face situations (e.g. instrument failures) with extremely limited resources and the use of initiative became the key to job survival in those [Illegible] locations.

Following the completion of all contracts in Columbia, I opted for a transfer to *Canada* in September [Illegible] and was initially assigned to work in *Alberta and British Columbia,* Western Canada. I was subsequently requested by Exlog Canada to head a team of Logging Geologists on a new contract for

Mobil Oil *et al.* on the Hibernia O-35 'wildcat' exploration well. It was this well that firmly established the potential of the Hibernia field.

During my first year in Canada, I established a reputation with my Company as a person who was able to teach and train new employees the necessary skills for wellsite work. Over a period of nine months I trained six graduates.

In June, 1980, I was promoted to Wellsite Geologist and returned to the Alberta/B.C. foothills for B.P. Canada. This job brought satisfaction through the various demands and responsibilities placed upon [Illegible] B.P. Canada.

I transferred back to Europe in July, 1981, for a two year assignment where I gained further [Illegible] experience in the Dutch North Sea and within the *Persian Gulf,* working for Pennzoil and Shell respectively. Upon return to Canada in July, 1983, I was reassigned to the *Hibernia Field* and later to the *Nova Scotian Shelf.*

Pre-university

Prior to attending University in 1974, I was employed by the *Central Electricity Generating Board,* Power Gen.) Ratcliffe-on-Soar Power station, Nottinghamshire, England, as an Engineering Assistant to the Outage Planning Dept. in 1974.

Publications

Stasiuk, L., Kybett, B. D., & Bend, S. L.

"An assessment of thermal maturity using micro-FT-ir and petrography"
Conf. Proc. of the TSOP Annual Meeting, Pen. State., 20th - 24th July, 1992

Bend, S. L.

"The origin, formation and petrographic composition of coal"
Journal of Fuel. 1992 June 71. p.851-870

Bend, S. L., Edwards, I.A.S. and Marsh, H.
"The influence of coal rank upon the formation and combustion of coal"
Journal of Fuel. 1992 April. 71, p493-501

Bend, S. L., Edwards, I.A.S. and Marsh, H.
"Coal provincialism, coal characterization and char formation"
Journal of Fuel. 1991 October. 70, p1147-1150

Bend, S. L., Edwards, I.A.S. and Marsh, H.
"The effects of oxidation and weathering on char formation and coal combustion"
in: *'Coal Science II'*, (Schobert, H., Bartle, K., and Lynch, L. Eds.) ACS Symposium Series 461. 1991 (Chapter 22) p284-298

Koslowski, D. and Bend, S. L.
"The oxidation of low rank coals"
Ext. Abstracts, Haquebard Symp., Gac-Mac Meeting, Wolfville, Nova Scotia, 24th - 27th May, 1992

Bend, S. L., Edwards, I.A.S., Kuo, K. and Marsh, H.
"Aspects of coal oxidation and char combustion"
Proc. of the Third Coal Res. Conf. Wellington, New Zealand, 9-11th Oct. 1989, p230-239

Bend, S. L., Edwards, I.A.S. and Marsh, H.
"Coal characterization and combustion efficiency"
Proc. Int. Conf. on Coal Science. October 1989 p437-440

Bend, S. L., Edwards, I.A.S. and Marsh, H.
"The effects of oxidation and weathering on coal combustion"

American Chemical Society, 198th National Meeting, Div., of Fuel Chemistry, September 1989, Miami Beach, U.S.A., 34 (3), 923-930

Bend, S. L., Edwards, I.A.S. and Marsh, H.
"Coal pre-oxidation and combustion behaviour"
Proc. 19th Biennial Conf. on Carbon, American Chemical Soc., Penn. State Univ. University Park, P.A., U.S.A., 26-30th June 1989, p604-606

Bend, S. L., Edwards, I.A.S. and Marsh, H.
"Petrographic characterisation of coal feedstock related to combustion efficiency"
7th Int. Conf. on Carbon., Newcastle upon Tyne, U.K., September 19-23rd 1988, Ext. Abstracts, I.O.P. Press, Bristol, U.K. p594-596

Full papers submitted or 'in-press'

Stasiuk, L. D., Kybett, B. D., & Bend, S. L.
"Reflected light microscopy and Micro FT-ir of Upper Ordovician G. Prisca alginite in relation to palaeo-environment and petroleum generation, Saskatchewan, Canada"
Submitted to the international journal of *Organic Geochemistry and Organic Petrology* (under review)

Bend, S. L. and Kosloski, D.
"A petrographic analysis of coal oxidation phenomenon"
Submitted to the *International Journal of Coal Geology* (accepted for publication)

Bend, S. L. and Nambudiri, V.
"The fluorescence of wood and the potential of fluorescence of microphotometry"
Submitted to the *Canadian Journal of Forestry Research* (in-press)

Conference presentations submitted and under consideration

Bend, S. L.
"The FT-ir TGA analysis of oxidised low rank coal emissions"
Submitted to International Conference on Coal Science Bi-annual Meeting (September 1993)

Stasiuk, L., Kybett, B. D. and Bend, S. L.
"Micro FT-ir of oil-prone macerals, palaeozoic hydrocarbon source rocks from Saskatchewan, Canada"
Submitted to GAC MAC Joint Annual Meeting (May 1993)

Kosloski, D. and Bend, S. L.
"The influence of inherent moisture during the oxidation of low rank coal"
Submitted to GAC MAC Joint Annual Meeting (May 1993)

Previous Conference Attendance

TSOP Annual Meeting, 20th - 24th July, 1992 Penn State University, State Coll., Pennsylvania, USA
44th International Meeting of the ICCP, 19th - 23rd July 1992, Penn. State University, Pennsylvania, USA
Haquebard Symposium, GAC-MAC Meeting, Wolfville, Nova Scotia, 24th - 27th May, 1992
Canadian Society of Organic Petrographic June, 1991, Edmonton, Alberta.
Canadian Society of Organic Petrographic June 1990, INRS-Petrole, Quebec.
'Coal Structure and Reactivity' September 1990, Cambridge, England.
'Advances in Coal Science: Peter Given Memorial Symposium' September 1989, Miami Beach, USA
'Carbon '88 - 7th International Conference on Carbon' September 1988, Newcastle upon Tyne, England
41st Meeting of the International Committee for Coal Petrology September 1988, Aachen, Germany

'Micro '87: Industrial and Biomedical Microscopy' July 1987, London, England.
'6th International Conference on Coal Technology and Economics' June 1987, London, England.
'Coal Science '87: International Conference on Coal Science' October 1987, Maastricht, The Netherlands
'Coal and Coal-bearing Strata: Recent Advances' April 1986, London, England.

Seminars and Workshops Attended

'Low Rank Coal Combustion' July 1991, Billings, Montana.
Hydrocarbon Exploration of the North Sea March 1986, Newcastle upon Tyne, England.
Evaporites and hydrocarbon exploration, January 1986. J.A.P.E.C. Burlington House, London, England.
Petroleum Geochemistry, July 1984, J.A.P.E.C., Imperial College, London, England.
Drill Stem Testing, April, 1981, Lynes Wireline, Calgary, Alberta, Canada.
'Canadian Stratigraphic School', October, 1980, Canstrat Inc. Calgary, Alberta, Canada.

Grants Received

1992 $75,000 (for 3 years)
from Saskpower, Prairie coal and Estevan coal
'The geochemistry and petrology of minerals and trace elements within lignite'
1991 $50,400 (for 3 years)
National Sciences Research Council (Canada)
'An evaluation of oxidation tests suitable for low rank coals'
1990 $4,760
Presidents National Sciences Research Council (Canada)
1990 $5,000
Faculty of Science Start up Grant

Societies and Professional Affiliations

Geological Society of London, UK. (Fellow)
International Committee for Coal Petrology (Member)
The Society for Organic Petrology (Member)
Canadian Petrography Society (Member)
Canadian Thermal Analysis Association (Member)
Saskatchewan Geological Society (Member)

Serving on the Review Board for:
the International Journal of Fuel
the International Journal of Coal Geology
and assessing grant applications for the National Sciences and Enginering Research Council of Canada

Miscellaneous and Personal Information

Non-vocational achievements

Represented Great Britain at the 1982 Ski-orienteering Pre-World Championships at Lavarone, Italy
Placed 34th in the world championship rankings

Hobbies/Interests

Photography, painting, horology, Competitive cross-country skiing and Biathlon, Orienteering.

References

Prof. D. G. Murchison (tel. 91-222-6000 ext. 6605)
N.R.G. (Newcastle Research Group)
Drummond Building,
The University,
Newcastle upon Tyne,
NE1 7RU
England

Prof. H. Marsh (tel: 618-453-7351)
Department of Geology
Southern Illinois University at Carbondale
Carbondale,
Illinois
62901-4324
USA

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF COLORADO

[Caption Omitted]

Case No. 91-B-2273

AFFIDAVIT OF JAMES T. COOPER

James T. Cooper, being duly sworn, deposes and says:

1. My name is James T. Cooper. I am employed by Energy Fuels Corporation as Vice President of Operations for Coal Property. I reside at 2949 South Biscay Street, Aurora, Colorado, 80013.

2. I have previously been employed as President of Sunnyside Mine (a coal mine in Utah), self-employed as a consultant with regard to coal mining and worked for Jim Walter Resources (a coal mining operation in Alabama). A copy of my resume is attached as Exhibit 1.

3. I have been retained by the Southern Ute Indian Tribe to describe the concerns of an operator and manager of coal mining operations about coalbed methane and how the production of coalbed methane may effect the operation of a coal mine. I prepared a report setting forth my views on these matters and had my deposition taken by the defendant Amoco on March 25, 1993.

4. Since miners first went underground for coal production, they have been acutely aware of a hazardous, highly explosive gas in the coal. Although it sometimes contains other gases, that gas is commonly referred to as methane. This gas is always present in coal. Methane is known to be highly explosive in an atmosphere that contains 5-15% of methane. Current federal regulations require methane to be kept at 1% or less of the atmosphere in all active working places of underground coal mines.

5. Methane originates during the coalification process. The coalification process is the forming of coal from plant

material (plant to peat to lignite coal to sub-bituminous coal to bituminous coal to anthracite coal). It is contained within the coal seam and the cleats and fractures of the coal and adjacent structures. Coal seams as sources of methane are characterized by the coal rank, pressure (depth) and hydrogeologic conditions.

6. Coal miners have known that coal seams contain methane which normally is liberated from freshly disturbed coal and contained in fractures in the coal seam. To diminish the dangers of methane in underground coal mines, operators traditionally increased ventilation (pumping of fresh air) into the mine. The purpose of increasing ventilation is to maintain a non-explosive atmosphere in the mine. Traditionally, the air circulated through the mine has been vented to the surface.

7. Methane is also a serious consideration with regard to the transportation of coal. Because methane continues to escape from the coal even after it is mined, steps must be taken to ensure adequate ventilation as the coal is transported from the mine to the place of use. All enclosures (storage facilities, tunnels, ships, etc.) that contain coal have to be proeprly ventilated. This ventilation is required to ensure that methane, which is lighter than air, does not accumulate in the enclosure and create an area of explosive atmosphere.

8. As the federal mining regulations developed, maximum limits of methane content in the mining atmosphere were established as requirements for safe mining. This increased the cost of production. In the early 1960s and 1970s, the U.S. Bureau of Mines conducted research on how to improve mine safety. This research focused on the existence of methane in coal seams and methods of control of the gas. As a result of this early work, the coal industry began degasifying coalbeds in advance of mining. Early attempts at degasification were vertical boreholes and later horizontal boreholes in the coal seam. Degasification yielded immediate benefits, including improved

safety and decreased cost, to the coal industry. The gas produced by coal degasification was also sold by the coal operator.

9. From operating experience, coal miners know that the coal must be acted upon or disturbed in some manner (exposure, cutting, crushing, shooting, . . . etc.) to liberate the methane. From a coal operator's viewpoint, the methane can only be obtained by altering the coal seam (artificial stimulation). The Jim Walters Resources' Black Warrior methane recovery project for their Alabama coal mines illustrates this. Approximately 83% of the methane produced is from the gob area (mined areas), 7% from vertical wells and 10% from horizontal wells.

10. The artificial stimulation required to disturb the coal seam in order to produce coalbed methane is a matter of concern to the coal mine operator. The effect of the stimulation on the coal seam and adjacent structure, above and below, are normally adverse to the needs of a coal mine operator. Coal miners normally consider fractures of the coal seam or adjacent structures to have a negative impact on coal production. A fractured roof, floor and/or seam generally translates into additional operating costs, loss of productivity and increased safety hazards in coal mining. In addition, the introduction of substances (i.e., gels, sands, . . . etc.) into a coal seam to be mined creates problems for the coal producer who is concerned about the quality of the product.

FURTHER THE AFFIANT SAYETH NAUGHT.

/s/ James T. Cooper
JAMES T. COOPER

[Notary Omitted]

EXHIBIT ONE

JAMES T. COOPER

Business

1200 17th Street
Suite 2500
Denver, Colorado 80202
(303) 623-8317

Residence

2949 South Biscay Street
Aurora, Colorado 80013
(303) 680-1139

CAREER OBJECTIVE

Challenging management responsibilities in the mining industry.

QUALIFICATIONS SUMMARY

Over twenty years of management experience with responsibilities including administration, engineering, maintenance and production. Experience encompasses all phases of surface and underground coal mining. Noted for having a through understanding of the coal industry with skills in the following:

- Management and Leadership
- Cost Management
- Productivity and Safety
- Organizational Development
- Directing Engineering, Financial and Acquisitions Group
- Marketing
- Human Relations
- Implementing Turnarounds

CAREER HIGHLIGHTS

Start up of nine mines; five of which were new operations.

Led acquisitions efforts resulting in the purchase of property, minerals, equipment and operating businesses.

Directed financing activities for the purchase of three operations.

Chaired Management Team negotiating 1981 UMWA Labor Contract. Negotiations resulted in a three-year agreement with two holidays, one sick day, $.05/hour less than the standard Western UMWA Labor Agreement and no interruption to the operation.

Orchestrated numerous UMWA grievances and arbitrations that resulted in favorable decisions. Returned a 3.8 mmty surface operation to profitability: 33.8% reduction in employment (35.1% salared personnel and 33.3% reduction UMWA union personnel); 30% reduction in cost: and 0% capital expenditures while maintaining the production rate. Directed the return of three underground operations to profitability since 1980.

Directed the development and implementation of safe, environmentally sound, productive mine plans.

Excellent knowledge of mining regulations, labor regulations and labor contracts.

Implemented substantial manpower reductions while increasing annual production at every operation.

Earned the reputation of a well-organized, decisive leader who consistently meets or exceeds goals and targets by building and motivating teams of results-oriented managers.

Responsible for and/or participant in negotiations of long-term coal supply agreements (one $80-million).

Noted for being hard working, honest, direct and fair.

MANAGEMENT HISTORY

Sunnyside Mines, Inc.	1989-1990
Boulder, Colorado	President
Energy Fuels Corporation	1979-1989
Denver, Colorado	Vice-President-Operations
Steamboat Springs, Colorado	Mine Manager
Jim Walter Resources, Inc.	1972-1979
Tuscaloosa, Alabama	Maintenance Superintendent
Tuscaloosa, Alabama	Division Maintenance Engineer
Tuscaloosa, Alabama	Sr. Electrical Engineer
Tuscaloosa, Alabama	Sr. Project Engineer
Amoco Chemicals Corporation	1970-1972
Decatur, Alabama	Sr. Plant Engineer

EDUCATION

University of Alabama

B.S. Electrical Engineering 1968

Additional courses in advanced management, economics, cost management, leadership, motivation, labor and environmental regulations, mining techniques and human resources.

PROFESSIONAL AFFILIATIONS

Society of Mining Engineers

Rocky Mountain Coal Mining Institute

Mountain States Employers Council

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF COLORADO

[Caption Omitted]

Case No. 91-B-2273

AFFIDAVIT OF J. CRAIG CREEL

J. Craig Creel, being duly sworn, deposes and says:

1. My name is J. Craig Creel. I am a petroleum reservoir engineer. I am presently employed as the Executive Vice President of Cawley, Gillespie and Associates, Inc. My work address is 302 Fort Worth Club Building, Fort Worth, Texas 76102.

2. At Cawley, Gillespie and Associates, I am involved in reservoir engineering, the estimation of oil and gas reserves and the resulting future cash flow, and the estimation of the value of oil and gas reserves. This involves the application of petroleum reservoir and production engineering techniques. I was previously employed by Sun Oil Company as a production and reservoir engineer. I have performed reservoir engineering services in the Ignacio Blanco gas field. This field includes the Southern Ute Indian Reservation. I am familiar with both conventional natural gas and coalbed methane production and reserves in the Ignacio Blanco field. I am familiar with the completion and production techniques used for both conventional natural gas and coalbed methane wells. A copy of my resume is attached to this Affidavit.

3. I have been retained by the Southern Ute Indian Tribe to describe the differences between a coalbed methane and a conventional natural gas reservoir, including gas origin, trapping mechanism, gas storage, gas fluid flow, and production techniques.

4.1 *Definitions.* To prevent misunderstanding, certain terms need to be defined as they are used within the petroleum industry.

4.2 "Natural gas" is defined as hydrocarbons or mixtures of hydrocarbon and non-hydrocarbon components that exist as a vapor phase at the temperature and pressure under consideration.

4.3 "Hydrocarbon liquids" are hydrocarbons or mixtures of hydrocarbon and non-hydrocarbon components that exist as a liquid phase at the temperature and pressure under consideration.

4.4 "Porosity" is the portion of the void space within a rock expressed as a percentage or fraction of the bulk volume of the rock. The porosity in conventional natural gas reservoirs in the San Juan Basin ranges from 3% to 20% with an average of 14%. The coalbed methane reservoirs of the Fruitland coal formation have a porosity of less than 3%.

4.5 "Permeability" is the measure of a rock's ability to transmit fluids along a pressure gradient. For example if a well is drilled into a conventional sandstone natural gas reservoir that has a pressure of 1,000 pounds per square inch it will create a point of low pressure and gas will flow through the porous standstone to the wellbore. The flow of a fluid[1] through a permeable medium is described by Darcy's Law. The unit of measurement for permeability is called the Darcy. In a reservoir rock such as sandstone, oil or gas within it exist in a "free" state, i.e. the molecules of the oil or gas are not physically bound to the surfaces within the reservoir rock. Darcy's Law states that the magnitude of the fluid mass flow rate is proportional to the cross-sectional area through which flow occurs, the permeability and

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[1] In this context, a "fluid" may be either a gas or a liquid.

the pressure gradient. Movement of a free fluid occurs in the direction of decreasing pressure.

4.6 "Reservoir" is a naturally occurring subsurface body of permeable rock that contains pore spaces in which hydrocarbon liquids and/or hydrocarbon gases reside. Sandstone and limestone are examples of permeable rock that often contain the pore spaces in which oils and/or gases may reside. Another essential characteristic of a reservoir is a trapping mechanism. One example of a trapping mechanism is a layer of impermeable rock overlying the strata of porous and permeable reservoir rock which forms a cap that acts as a seal and does not allow the oil or gas to escape upwards. Examples of cap rocks are salt and shale. Without a trapping mechanism, the oils or gases residing in the pore spaces are free to migrate and disperse.

4.7 The "diffusion coefficient" of a rock is the measure of that rock's ability to transmit fluids which are physically bound within the rock, i.e., are not "free," as the result of a difference in the concentration of that fluid from one location within the rock to another. For example molecules may be sorbed, or physically bound, within coal. The flow of sorbed fluids is described by Frick's Law. Frick's Law states that the magnitude of fluid mass transfer is proportional to the surface area through which flow occurs, the diffusion coefficient, and the concentration gradient. Movement occurs in the direction of decreasing concentration.

4.8 "Conventional" oil and gas reservoirs. An example of a conventional oil and gas reservoir is a sandstone formation capped by shale. On the Southern Ute Indian Reservation the Pictured Cliffs sandstone formation is a conventional natural gas reservoir.

4.9 "Unconventional" oil and gas reservoirs are those reservoirs with characteristics that are significantly different from conventional reservoirs. For example, a coalbed methane reservoir is universally regarded as unconventional.

5. The flow of free fluids within a reservoir and the flow of sorbed fluids within a reservoir are two entirely different properties. The performance of conventional natural gas reservoirs in the San Juan Basin is controlled by Darcy's Law only. The performance of coalbed methane reservoirs within the San Juan Basin are controlled by *both* Frick's Law and by Darcy's Law.

6. Over 99% of the gas in a conventional reservoir exists in a free state within the pore spaces. In the unconventional coalbed methane reservoir of the Fruitland formation, a minimum of 95% of the gas exists in the sorbed state within the macromolecular matrix of the coal.

7. The natural gas in most conventional reservoirs does not originate in the reservoir. Rather, the gas originated in a different rock strata, or source rock, and migrated into the reservoir where it was trapped. The gas in a coalbed methane reservoir originated in the coal. In other words, the coal was both the source rock and is the depository for the natural gas.

8. As mentioned above, the porosity of a coalbed methane reservoir is markedly different than the porosity of a conventional natural gas reservoir. Despite the fact that a coalbed methane reservoir is much less porous than a conventional reservoir, a cubic foot of Fruitland coal with only 0.5% porosity will contain much more methane than a cubic foot of a conventional sandstone reservoir with 20% porisity. This difference is due to the fact that most of the methane in coal exists in a sorbed state within the macromolecular matrix of the coal whereas virtually all of the methane in a conventional sandstone

reservoir exists in a free state. Figure 1 shows this difference.

9. As noted above, the trapping mechanism of a conventional natural gas reservoir is often an impermeable barrier which caps the permeable reservoir rock so that free gas cannot flow out. Many different trapping mechanisms exist. *See e.g.,* Marlan W. Downey, "Evaluating Seals for Hydrocarbon Accumulations," *The American Association of Petroleum Geologists,* V. 68, No. 11, November 1984, p. 1752. None of these trapping mechanisms are necessary for a coalbed methane reservoir to exist. This is because the methane is bound within macromolecular structure of the coal by the forces of sorption. Unfractured coal is virtually impermeable. In other words, free gas exists in a coalbed methane reservoir only in the cleats and fractures of the coalbed. Darcy flow of free gas in a coalbed can occur only within the fractures and cleats. A coalbed may be overlaid by a strata of porous sandstone, i.e., is not capped by an impermeable barrier, and still function as a reservoir. Stated another way, the trapping mechanism of a coalbed methane reservoir exists within the reservoir rock itself. The trapping mechanism of a conventional natural gas reservoir exists outside the reservoir rock.

10. Drilling a well into a reservoir and opening the valve at the surface will reduce the pressure within the reservoir. For example, if a well is drilled into a conventional natural gas reservoir with an initial reservoir pressure of 1400 psi and gas is produced until the reservoir pressure is depleted to 400 psi, then 75% of the gas-in-place will be recovered. The same amount of pressure reduction in a Fruitland formation coalbed methane reservoir will result in recovery of only 30% of the gas-in-place. For each pound per square inch of pressure decrease that a pressure depletion reservoir undergoes, a fixed volume of gas will be produced. The production curves for conventional natural gas reservoirs and coalbed

methane reservoirs in relation to reservoir pressure reduction are markedly different. These are shown in Figure 2.

11. Comparing the cumulative production from conventional natural gas and coalbed methane wells in La Plata and Archuleta Counties, Colorado demonstrates that the production of water is correlated with coalbed methane wells. Over 97% of the conventional natural gas wells have produced less than 100 barrels of water for each million cubic feet of natural gas production. Only 7% Fruitland formation coalbed methane wells have produced such small volumes of water. This is illustrated in Figure 3. The production of large volumes of water is an integral part of coalbed methane production in this portion of the San Juan Basin.

12. When a Fruitland formation coalbed methane well is drilled in this portion of the San Juan Basin, the pressure in the reservoir adjacent to wellbore is reduced by producing water. As more water flows into the wellbore and out of the reservoir, the sorbed methane molecules break the bonds that hold them within the macromolecular structure of the coal and begin to diffuse through the macromolecular matrix due to the concentration gradient and Fick's Law. The methane molecules continue to diffuse from the matrix until they reach fractures or cleats. When the methane molecules diffuse into a fracture or cleat it becomes free gas and flow is governed by pressure differentials and Darcy's Law. A coalbed methane reservoir exhibits different behavior with decreasing pressure than does a conventional natural gas reservoir. Figure 2.

13. The completion techniques and production equipment used for coalbed methane wells are usually different from the techniques and equipment used for wells completed in conventional natural gas reservoirs. This is particularly true in Southwest Colorado. Since 1987, approximately 200 Fruitland formation coalbed methane

wells have been completed as open-hole cavity completions. According to Matthew Mavor, a consultant to Amoco, in the San Juan Basin there were approximately 870 open-hole cavity completion attempts as of September 1991 out of a total of approximately 2200 wells. This is a completion technique unique to coalbed methane.

14. The open-hole cavity completion technique, in lay terms, involves using highly pressurized air and water to blow out a spherical cavity in the coalbed at the bottom of the wellbore. The portion of the wellbore in the coalbed and the cavity are not cased and are therefore called "open." The open-hole cavity technique extracts solid coal up the wellbore. The chunks of solid coal that are removed from the coalbed are the same material as mined coal. Up to 100 tons of solid coal may be removed from the wellbore by this technique.

15. Other coalbed methane completion techniques result in the extraction of solid coal, although in lesser amounts.

16. Because coal is impermeable, most coalbed methane wells that have been completed using a technique other than open-hole cavitation have been hydraulically fractured and stimulated. There are many different hydraulic fracture and stimulation techniques used on coalbed methane wells. Some coalbed methane fracture and stimulation techniques have been patented. In general, the purpose of fracturing and stimulating a coalbed methane well is to expand the natural fractures in the coal seam, and prop those fractures open to create more space within the coalbed which can hold and transmit gas in a free state. Coalbed methane wells are fractured by injecting thousands of gallons of stimulation fluids down the wellbore and out into the coalbed under extremely high pressure. There are a variety of stimulation fluids including, hydrochloric acid, nitrogen foam, carbon dioxide foam, cross-linked gelled water, linear gelled water, and water. The fractures created are often propped open

by injecting sand into them. As much as 120,000 pounds of sand is injected down the wellbore and out into the coalbed. Fracturing and stimulating a coalbed methane well will affect the coalbed up to hundreds of feet away from the wellbore.

17. Since most Fruitland formation coalbed methane wells in Southwest Colorado produce water, the production equipment used with these wells is different from that installed on wells completed in conventional reservoirs. Based on reported initial production, over 50% of the Fruitland formation coalbed methane wells are produced using some means of artificial lift. The most common artificial lift technique is downhole rod pumps, but some wells are produced by gas/lift techniques.

18. Virtually all completion techniques used on coalbed methane wells result in a significant alteration of the natural state of the coalbed. Solid coal is extracted from the coalbed. Typically, vast quantities of water are removed from the coalbed. Foreign substances are often injected into the coalbed.

19. The quality of gas produced by Fruitland formation coalbed methane wells is also different from the gas produced from conventional reservoirs. Less than 40% of Fruitland formation coalbed methane wells produce gas with a heating value over 1000 BTU per standard cubic foot of gas. Over 70% of conventional gas wells produce gas with a heating value over 1000 BTU per standard cubic foot. The composition of gas produced from Fruitland formation coalbed methane wells also differs from the composition of gas produced from conventional reservoirs. In general, Fruitland formation coalbed methane wells produce a gas with a higher concentration of carbon dioxide. Conventional reservoirs in the same area produce a gas with higher concentrations of ethane and almost no carbon dioxide. Coalbed methane produced from Fruitland formation coalbeds is unique

and differs from gas produced from deeper conventional reservoirs in the same area.

20. The volume of coalbed methane produced in Southwest Colorado increased markedly beginning in approximately 1987-88. The history of production volume in this area is shown in Figure 4.

FURTHER AFFIANT SAYETH NAUGHT.

/s/ J. Craig Creel
J. CRAIG CREEL

[Notary Omitted]

Figure 2

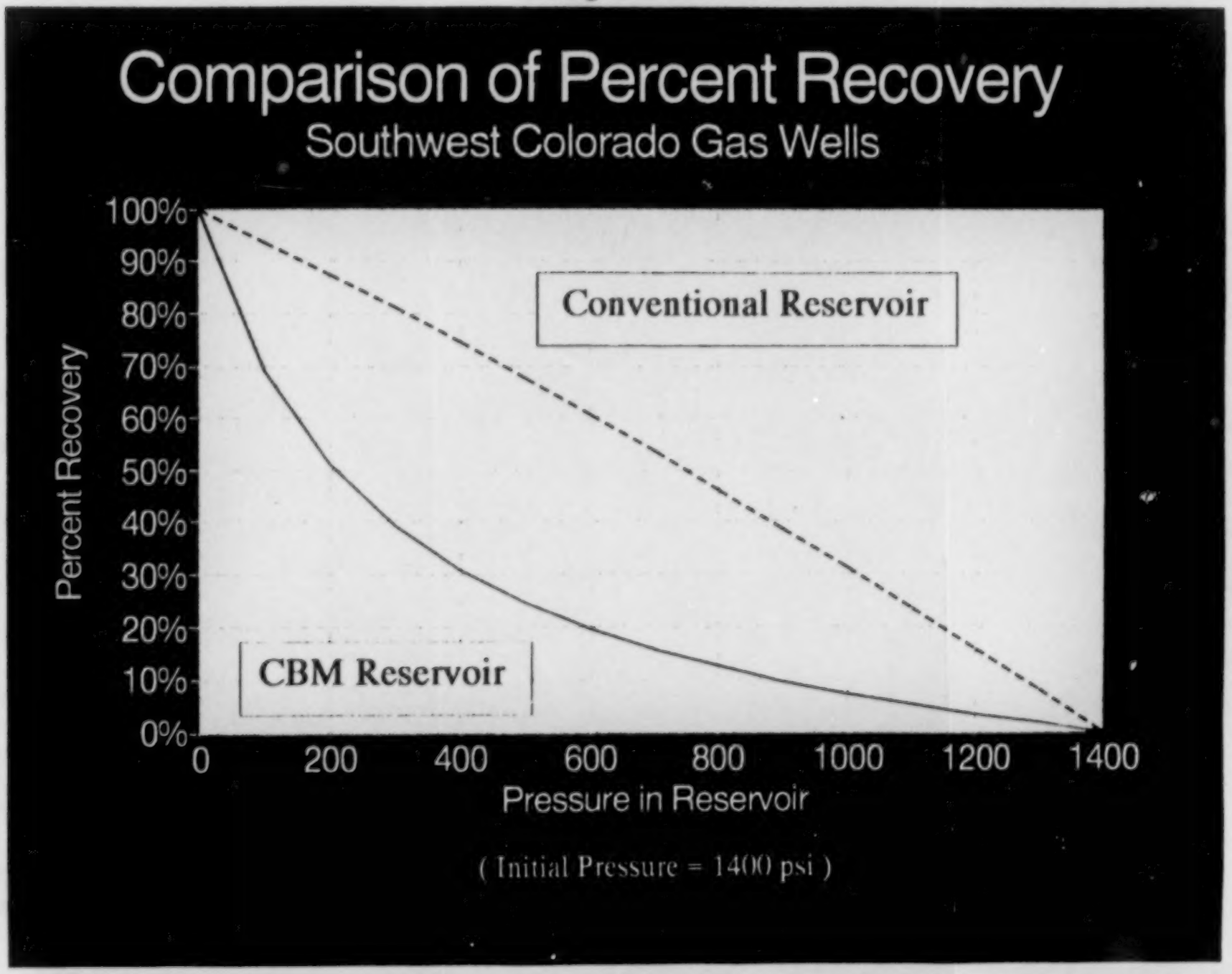

Figure 2

Figure 3

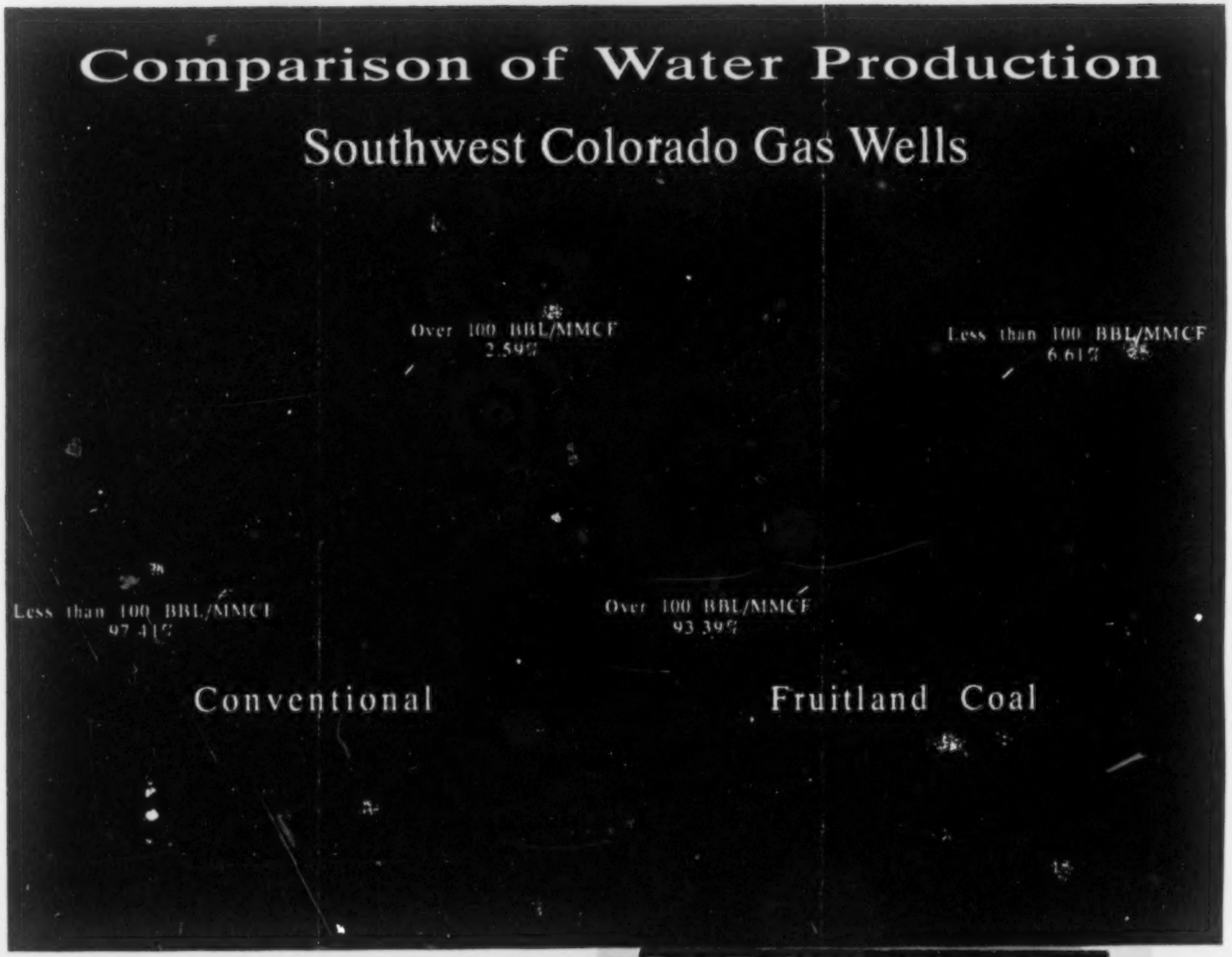

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Figure 3

J. CRAIG CREEL

CAWLEY, GILLESPIE & ASSOCIATES, INC.
306 W. 7th St., Suite 302
Fort Worth, Texas 76102
(817) 336-2461

BIOGRAPHICAL DATA

Birthdate: June 30, 1952 Marital Status: Married,
Citizenship: United States three children

EDUCATION

College

B.S., Cum Laude, Petroleum Engineering, Texas A&M University (1974)

Honor Societies

Pi Epsilon Tau (Petroleum Engineering Honor Society)

EXPERIENCE

Cawley, Gillespie & Associates, Inc., Exectuive Vice President (January 1992-Present)

Involved in the estimation and audit of oil and gas reserves, the forecast of these reserves and their resulting future cash flow, and the estimation of the value of the reserves. This involves the application of petroleum reservoir and production engineering techniques, as well as the estimation and utilization of various economic parameters such as oil prices, gas prices, and operating expenses. Performs coalbed methane reservoir studies, performance evaluations, gas-in-place estimates, log analysis, reserve and economic evaluations, drainage studies, plans for drilling.

Interfacing with clients on a daily basis. Involved in the writing and designing of the custom software used

within the firm. Have performed numerous reservoir simulations on oil and gas fields located both in the Continental U.S. and elsewhere.

Cawley, Gillespie & Associates, Inc., Senior Vice President (January 1989-December 1991)

Estimation of oil and gas reserves, forecasts, future cash flow, value estimation of the reserves. Performed reserve audits, and supplied various reports to financial institutions. Evaluation of coalbed methane reserves. Prepared various field studies for optimization of reserve depletion and economic investment criteria.

Cawley, Gillespie & Associates, Inc., Vice President (January 1988-December 1988)

Estimation of oil and gas reserves, forecasts, future cash flow, value estimation of the reserves. Performed reserve audits, and supplied various reports to financial institutions. Prepared various field studies.

Cawley, Gillespie & Associates, Inc., Petroleum Consultant, (October 1976-Present)

Joined firm in October 1976. Assisted senior engineers with property evaluations; performed reservoir simulation studies; prepared evaluations for acquisitions. Company principal since 1980.

Sun Oil Company, Production/Reservoir Engineer, Richardson, Texas and Lafayette, Louisiana (May, 1974-October, 1976)

Involved in the daily operations of a major field located in southern Louisiana. Responsible for maintaining the producing rates and for identifying, recommending compiling workovers and recompletions. Was transferred to the Richardson Reservoir Simula-

tions Lab to work on the reservoir description and mathematical simulation of several of Sun Oil's major fields.

PROFESSIONAL AFFILIATIONS

Society of Petroleum Engineers

Registered Professional Engineer in Texas-Registration #4425

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLORADO

[Caption Omitted]

Case No. 91-B-2273

AFFIDAVIT OF JEFFREY R. LEVINE

STATE OF ALABAMA)
) ss.:
COUNTY OF TUSCALOOSA)

Jeffrey R. Levine, first being duly sworn, deposes and says:

1. My name is Jeffrey R. Levine. I reside at 1805 13th St. E., Tuscaloosa, Alabama 35404. I am self-employed as a consulting geologist with offices at 2715—7th St., Tuscaloosa, Alabama 35401.

2. I have previously been employed by The University of Alabama, where I worked for seven years as Associate Research Geologist. I have also worked for two years as Research Associate in Sedimentology at McGill University in Montreal, Canada, and for three years as Research Geologist at the United States Bureau of Mines, Pittsburgh Mining and Safety Research Center, Methane Control and Ventilation Group. A copy of my resume is attached as Exhibit 1.

3. In 1983, I received my Ph.D. in Geology from Pennsylvania State University, specializing in coal geology. My doctoral thesis was entitled "Tectonic Evolution of the Pennsylvania Anthracite Region Using Coal Reflectance Anisotropy".

4. During my career, I have specialized in the study of what is commonly referred to as coalbed methane. While

employed by the Bureau of Mines, I participated in some of the earliest, pioneering research work in this area. Specific projects at the U.S.B.M. included co-supervising the drilling of an experimental methane drainage bore hole in the Pennsylvania Anthracite region; evaluating coalbed methane resource potential in the San Juan and Raton basins, New Mexico and Colorado; assisting in development of U.S.B.M. "direct method" calculation of coal bed gas concentrations; and compilation of data on gas yields of coal as a function of coal rank and depth.

I have worked on diverse projects relating to coalbed methane at The University of Alabama. Specific research topics include studies of methane sorption in coal, sorption-related swelling of coal, coalbed methane resource assessments, and novel methods of coal analysis.

I have also developed and conducted industry-oriented training course(s) on coalbed methane, including a short course entitled "Introduction to Coal Petrology with Applications to Coalbed Methane R & D". These courses have been taught in a variety of academic and industry settings including The University of Alabama, Pennsylvania State University, the Institut Francais du Pétrole (French Petroleum Institute, Paris), MIM Holdings Ltd. (Brisbane, Australia), Shell Development Company (Houston, TX), ARCO Exploration and Production Technology (Plano, TX), Alberta Research Council (Edmonton, Alberta), among others.

5. I have published approximately 25 professional papers during my career. I have authored or co-authored 12 articles and 10 abstracts specifically related to coalbed methane, including resource assessment, analytical methods, and geologic controls.

I have recently delivered invited Keynote Addresses on the topic of coalbed methane at three international meetings: the International Committee for Coal and Organic Petrology (University Park, PA, July, 1992), the Symposium

on Coalbed Methane Research in Australia (Townsville, Australia, Nov., 1992) and the ARCO Coal Symposium (Plano, TX, April, 1993).

6. I have been retained by the Southern Ute Indian Tribe to provide advice regarding the composition and origin of coal, particularly as related to the production of gas (commonly referred to as "coalbed methane") from coal seams. Specifically, I was asked to address the following questions: What is coal? What are the constituents of coal? Is coalbed methane a part of coal; and in what ways do coalbed reservoirs differ from conventional gas reservoirs? I prepared a report addressing these topics and had my deposition taken by the defendant Amoco.

7. The three most important conclusions that I have reached regarding the relationship of coalbed methane to coal are:

A. Coalbed methane is a constituent of coal. This view can be supported from the standpoint of coal chemistry, widely-used definitions of coal, and from a pragmatic perspective.

B. The constituents of "coalbed methane" remain in coal indefinitely (on a human time scale) unless they are "caused" to dissociate from the coal by reduction of fluid pressure in the coalbed as a result of drilling, pumping, flowing of gas, or other disturbances.

C. Geologic evidence indicates that: 1) most of the coalbed methane produced from San Juan basin coals formed within the coals themselves, as a product of coalification, and 2) coalification occurred and was concluded for the most part tens of millions of years ago. The coalbed methane so-formed has remained as part of the coal up to the present day.

8. Coal eludes a precise definition, even from a scientific perspective, owing largely to its complex and highly

variable nature. In spite of any differences among them, however, most published definitions of coal include three unifying elements: A) coal is a type of sedimentary rock, B) coal is comprised primarily of carbonaceous material, and C) coal is readily combustible. Beyond this, coal composition can be quite complex and variable. In the end, coal can be satisfactorily defined only through a detailed description of its composition and structure.

9. A particularly functional definition of coal appears in the American Geological Institute's Dictionary of Geological Terms (Bates and Jackson, 1980). This definition is adapted from the definition(s) originally developed by Dr. James M. Schopf of the U.S. Geological Survey (Schopf, 1956, 1966):

> coal—a readily combustible rock containing more than 50% by weight and more than 70% by volume carbonaceous material including inherent moisture, formed from compaction and induration of variously altered plant remains similar to those in peat. Differences in kinds of plant materials (type), in the degree of metamorphism (rank), and in the range of impurity (grade) are used in classification.

10. Certain important published definitions or descriptions of coal specifically mention water as a constituent of coal (Bates and Jackson, 1980; ASTM, 1991). Water behaves analogously to methane. If water is regarded as a constituent, then it is arbitrary not to regard other small molecular species such as methane as constituents of coal. For purposes of mining and commerce, water is routinely considered to be a constituent of coal. Federal guidelines published by the Office of Surface Mining (a division of the U.S. Department of Interior) stipulate that tonnages of coal mined and shipped must be calculated with respect to "inherent moisture" content. These regulations define inherent moisture as "moisture that exists as an integral part of the coal seam in its natural state, including water

in pores but not that present in macroscopically visible fractures" (emphasis added). This is also consistent with the definition of coal discussed previously (Bates and Jackson, 1980) which specifically regards moisture as a constituent of coal.

11. Definitions of coal describe coal as a mixture of constituents (i.e., a physical amalgam of constituents). Compositional heterogeneity is apparent at a variety of scales, ranging from "lithotypes" visible to the unaided eye (millimeters (10^{-3} m) to centimeters (10^{-2} m) in dimension), to "macerals" visible through the optical microscope (micrometers (10^{-6} m) in dimension), to "molecular scale" variability (nanometers (10^{-9} m) in dimension), discernible via gas chromatography and mass spectroscopy. The significance of the term "mixture" cannot be overemphasized, as it provides one of the keys to understanding coal composition and structure. In a chemical sense, a "mixture" refers to any combination of two or more substances that are not chemically bound to each other.

12. At a microscopic scale (i.e. at the limits of resolution of an optical microscope, which is approximately 10^{-6} m), coal can be regarded as being analogous to concrete in its composition and structure, in that both materials are comprised of mixtures of physically-associated materials. Concrete is an aggregation of sand and gravel bound together by Portland cement, while coal is an aggregation of (inorganic) mineral grains and (organic) "macerals" bound together in an organic matrix, all of which are part of the coal. When originally deposited, peats (which are the precursors of coal) comprise loosely compacted masses of vegetal remains. The vegetal remains are not chemically bound together (although they may be physically intertangled), and the peat may be readily broken apart by hand. During the coalification process, however, the woody material becomes depolymerized, partly solubilized, and gelified. At higher rank, in response to increased temperatures and pressures, this gel dehydrates, and the coal develops a physical coherency. The gelified material, which will become vitrinite, functions as the "glue" which binds the coal together, in much the same manner that Portland cement binds concrete together. The liptinite and inertinite macerals and mineral grains function in a similar manner to sand and gravel in concrete—lending strength to the mixture. Although all of the macerals and minerals in coal are consolidated in this way into a more-or-less coherent mass, they tend to maintain their distinct identity and morphology.

13. Many of the constituents of coal can be separated by using purely physical methods, i.e. without necessitating the breakage of chemical bonds. At the lithotype scale (cf. #11, above), mineral matter-rich layers in coal can be separated by using gravity separation methods. At the maceral scale, macerals can be segregated into groups by using ultra-fine grinding, followed by "density-gradient centrifugation". At the molecular scale, solvents can be used to remove soluble components, which can range up to 40% or more, depending upon the particular coal, and solvation method used. (Solvation, by definition, does not involve chemical bond breakage). Desorption of occluded gases can be regarded as a physical separation technique.

14. Uranium is a common trace element occurring in most coals, and may be present in varying amounts. When present, uranium typically has an "organic affinity"; that is to say, it is intimately associated with the organic fraction rather than the mineral fraction of coal. Distinct uranium-bearing mineral phases are typically not present, leading researchers to conclude that it is bound in some manner to the organic constituents of the coal.

15. Beginning with its initial deposition as a sediment on the earth's surface and continuing throughout its history, coal undergoes a progressive and ongoing evolution in composition and structure termed "coalification". Coal

"rank" provides a measure of the degree of coalification. The physical and chemical changes associated with coalification largely represent the response of sedimentary organic matter to elevated temperatures and pressures in the depths of the earth. Even though the composition and structure of coal may be radically altered during this process, the single term "coal" encompasses all such materials.

16. Methane originates along with other volatile substances as a product of coalification. Volatile coalification products are partly retained within the coal structure, wherein they become part of the coal, and partly expelled into surrounding strata, where they can form conventional (migrated) oil and gas deposits.

17. The organic molecular structure of coal is comprised primarily of the elements, carbon, hydrogen and oxygen. These element are assembled in a diverse number of molecular structure. The process of coalification, from peat through anthracite rank, is manifested by the progressive enrichment in elemental carbon accompanied by the depletion in hydrogen and oxygen. Hydrogen and oxygen are depleted in the form of methane (CH_4), carbon dioxide (CO_2), and water (H_2O).

18. The theoretical end member of coalification is pure carbon, in the form of graphite (although this is rarely attained in nature). Crystalline graphite is comprised of layered sheets of carbon atoms, arranged in a hexagonal pattern. Within these layers, the carbon atoms are bonded to one another with very strong covalent bonds. However, adjacent layers are held together only by very weak physical (Van der Waals) bonds. A crystal of graphite is comprised of many such layers stacked upon on another. The weakness of these interlayer physical bonds allows for the use of graphite as a lubricant, as the layers readily 'slip' next to one another.

19. Coal contains within its structure a certain proportion of comparatively small molecules commonly referred to as the "mobile phase" or "molecular fraction". The molecular fraction of coal evolves simultaneously with the rest of the coal as part of the coalification process. Methane is part of the molecular fraction of coal and represents the lowest molecular weight end-member of a complex series of hydrocarbons. Methane exhibits a similar relationship to coal structure as water, hydrocarbons, and other components of the molecular fraction. All of these substances occur as molecules that are not covalently bonded to one another but are weakly bonded to or physically entrapped within the coal structure. The matrix fraction of coal is linked together by relatively strong covalent bonds. Molecular constituents of coal are retained by much weaker "physical" bonds, including "hydrogen bonds" and Van der Waals bonds, as well as by physical "entanglements". Bond strength cannot be used as a criterion for distinguishing that which is "coal" from that which is not coal.

20. The polar forces that bind water to the coal structure are much stronger on average than the weak Van der Waals bonding that holds methane. Also, water can bond to itself, owing to its strong dipole moment. As a consequence, water is typically present in coal in much higher concentrations than methane, particularly at low rank. Nevertheless, water, mehane and other hydrocarbons all "compete" with one another for accessibility within the coal structure. To be fully understood, all the molecular components of coal must be regarded as part of a complex multi-component system.

21. The molecular fraction of coal contributes to the "volatile matter" measured in standard coal tests. The molecular fraction also contributes toward the soluble "bitumens" that can be produced from so-called "bituminous" coals. The coals underlying the Southern Ute Indian

Reservation are bituminous coals, having a high volatile matter yield.

22. Underground coal seams throughout the world contain an enormous quantity of methane (CH4) and other light hydrocarbon substances occluded within their molecular structure (estimated 400-800 trillion cubic feet in United States coals alone). ("Occluded" is a term in chemistry meaning adsorbed or absorbed in great quantity.) A variety of other small molecular species are also commonly present in coal, such as carbon dioxide (CO_2), nitrogen (N_2) and water (H_2O). For hundreds of years, the presence of these substances was manifested principally through their (unavoidable) release and discharge into underground coal mine workings, where they can pose a serious safety hazard. Methane, when liberated into the coal mine atmosphere, is the principal constituent of "firedamp" (a traditional miners' term for combustible mine gases), and is explosive when mixed with air in proportions from 5 to 15%.

23. Over the past two decades, technologies have been developed which enable commercial gases to be extracted from coal seams. Coal seam gas production has been successfully undertaken in association with active mining operations (before, during, and after mining), as well as in "virgin" coal seams where no active mining has yet taken place. It is the goal of coal seam degasification projects to produce gas at rates and volumes that render it economically competitive with other sources of natural gas. When done as part of an active mining operation, this process reduces the waste of hydrocarbon gases that would normally be liberated during mining.

24. Coalbed methane represents a fraction of coal that can be volatilized and released from coal by changing the ambient conditions. These volatile components (predominantly methane gas, plus some water, carbon dioxide, and notrogen, in most cases) can be released either by modifying the ambient pressure conditions, increasing the ambient temperature, or a combination of the two. Increasing the temperature also increases the *rate* at which volatile substances are released. Volatile gases escape from the coal by first diffusing from the coal matrix into a fracture. Once free from the coal microstructure, they assume the form of a free fluid (either liquid or gas). In this form, they may flow through the coal, assuming that there is a pressure gradient established. (Given a permeable medium, fluids tend to flow from high pressure to low.) The gases that are released from coal in this way effectively become what is known as "coalbed methane" or "coal bed gas". Prior to their conversion to a gaseous state, they are effectively part of the coal structure.

25. Removal of such volatile components of coal as methane, carbon dioxide, and water, is associated with volumetric shrinkage of the coal. This shrinkage phenomenon has been documented at several different laboratries, including my own studies conducted for the U.S. Department of Energy at The University of Alabama. Shrinkage is observed at all coal ranks and for all coal types. Volumetric shrinkage is proportional to the quantity of the occluded substance present, and typically represents only a few tenths of one percent change in length. The shrinkage phenomenon demonstrates that these substances are not merely occupying vacancies within the coal structure, but are interacting with and causing physical rearrangement of the coal.

26. The production of gas from coalbed reservoirs typically involves three fundamental elements: A) drilling a hole, B) completion/stimulation, and C) production of reservoir fluids. Drilling and installation of production tubing provides an open conduit through which reservoir fluids (typically water plus methane-rich gas) may be conducted to the surface. Completion/stimulation is intended to increase the interface and connectivity between the well

bore and the coalbed. This is usually done either by hydraulic fracturing or by "cavitation" method.

27. Production of gas normally entails the removal of water from the well by pumping. Pumping serves two purposes: A) It maintains a point of low pressure within the coalbed toward which fluids will flow and; B) It removes water from the bed so as to allow gases to flow more readily. In their natural state, the fracture networks in San Juan basin coals are usually water-filled. It has been shown, however, that water is essentially absent in some parts of the basin. In either case, when pressure in the bed is reduced, occluded species such as methane migrate out of the microporous coal matrix and into the fracture network where they join any other fracture-resident fluids already present. This mixture of fluids is then free to flow towards the production well. Any water that accumulates on the well bore is pumped off and disposed of. In addition to water, small particles of coal (known as "coal fines") and sand from hydraulic stimulation treatment may also flow into the well bore. The gases are collected, purified if necessary, transported, and sold. On a human time scale, the gases from coalbed reservoirs don't become migratory until the conditions in the coalbed are altered by drilling, stimulation, pumping of water.

28. Coalbed reservoirs differ from conventional reservoirs in many fundamental respects, including the following:

A) Source rock/reservoir rock relationship. In contrast with almost all conventional reservoirs, coals can serve as their own "source rock".

B) Trapping mechanism. Methane and other components of coalbed gas are held within the coal structure by weak bonding forces. Conventional reservoirs require a physical "seal" of low permeability strata to entrap the fluids.

C) Relationship to water. Even in water-saturated coals there may be lots of methane present. In conventional reservoirs, the presence of large volumes of water means that there is little or no producible gas.

D) Size of "porosity". Methane molecules in coal exist as part of the molecular structure, rather than in open "voids" in the rock. Pores in conventional reservoirs are as much as millions of times larger than "pores" in coalbed reservoirs.

E) Physical state of the "gas". Methane, etc., in coal exists in a "sorbed" state. In contrast, the gas in conventional reservoirs exists as a distinct gaseous phase for the most part.

FURTHER AFFIANT SAYETH NAUGHT

/s/ Jeffrey R. Levine
JEFFREY R. LEVINE

[Notary Omitted]

EXHIBIT ONE

Curriculum Vitae

JEFFREY ROSS LEVINE
Consulting Geologist
2715 Seventh Street
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Born:	January 24, 1953
Citizenship:	United States
Phone:	205-553-8827 (home)
	205-348-7612(fax)

EDUCATION:

Ph.D., Geology, 1983, The Pensylvania State University

Thesis title:

Tectonic evolution of the Pennsylvania Anthracite region using coal reflectance anisotropy

Thesis advisor:

Dr. Alan Davis

M.S., Geology, 1981, The Pennsylvania State University

Thesis title:

Optical anisotropy of coals as an indicator of tectonic deformation, Broad Top coal field, Pennsylvania

Thesis advisor:

Dr. Alan Davis

B.S., Geology, 1974, University of Michigan

Senior project:

Computer simulation of thermodynamic phase equilibria in the system MgO-SiO_2-H_2O-CO_2

Project advisor Dr. Eric Essene

RESEARCH INTERESTS AND EXPERTISE

Research Interests & Experience: Diverse interests relating to the petrology, organic geochemistry, sedimentary geology, and structural geology of sedimentary organic matter, including: generation and expulsion of oil and gas during organic metamorphism, behavior of coal as a production horizon for natural gas ("coalbed methane"), gas sorption studies, porosimetry. Other research interests include: the use of vitrinite reflectance anisotropy as a structural fabric indicator, structural geology and tectonics of foreland basin fold-and-thrust belts; structural fabrics imparted to sedimentary strata during burial, timing of tectonic events vis-a-vis organic metamorphism.

Research and Professional Skills: Sampling, processing, and analysis of coal and kerogen; microscopic analysis of coal and dispersed sedimentary organic matter, including petrography, reflectance and fluorescence measurement; fluid inclusion microscopy with heating/cooling stage; laser Raman microprobe; SEM/EDX and electron microprobe analysis; gas sorption studies using electro-microbalance; microstrain gage instrumentation; microcomputer applications including customized data acquisition systems, statistical analysis, data base management, graphics, and desktop publishing; Associate Editor, The Canadian Mineralogist, Issue on Applied Microscopy in Science and Technology (June, 1986); Past Editor for The Society for Organic Petrology (1989-92), which included compilation and publication of quarterly Newsletter as well as overseeing all TSOP publications.

Teaching Experience: Coal Petrology Lab (PSU), Introductory Geology lab (PSU), Oceanography lab (PSU), Sedimentary Diagenesis (McGill), Clastic Depositional Environments (McGill); Additionally

I have regularly taught a 3 credit hour senior/graduate level course in Coal Geology (UA); Short course on "Introduction to Coal Petrology with Applications to Coalbed Methane R & D"; Various industry training courses and seminars relating to "coalbed methane".

Foreign language proficiency in French.

PROFESSIONAL MEMBERSHIPS AND AWARDS:

Alabama Geological Society (1986-)
Geological Society of America (1982-)
American Association of Petroleum Geologists (1986-)
The Society for Organic Petrology (1985-):
(Councilor: 1987-89; Editor: 1989-1992)
Ph.D. thesis received unanimous superior rating and commendation to Dean (1983)
U.S. Department of Energy Traineeship (1978-80)
NSF Energy-Related Grants Traineeship (1977-78)

EMPLOYMENT HISTORY

10/92 - Present:

Self-employed consulting geologist: Specializing in geology and petrology of coal and other forms of sedimentary organic matter

10/89 - 9/92:

Associate Research Geologist and Adjunct Assistant Professor, Department of Geology, The University of Alabama: Research program in organic petrology and coalbed methane; senior/graduate level course in Coal Geology.

8/85 - 9/89:

Research Scientist, School of Mines and Energy Development, The University of Alabama (Tuscaloosa):

Designed and equipped coal petrology laboratory facility, established a coal research program at the University of Alabama, undergraduate and graduate instruction and research supervision; contributed to minerals processing and fuels research at the U of A Mineral Resources Institute. Coordinator of University of Alabama users group for ORNL-HTML.

8/83 - 8/85:

Research Associate in Sedimentology, McGill University, Montreal, Canada: Conducted research on the sedimentology, diagenesis, and petroleum generation of lower Paleozoic strata in SE Quebec; Undergraduate instruction in sedimentology and diagenesis.

6/74 - 8/77 (full time 8/77) - 8/81 (part time):

Research geologist, U.S. Bureau of Mines, Pittsburgh Mining and Safety Research Center, Methane Control and Ventilation Group: Co-supervised drilling of experimental methane drainage bore hole in Pennsylvania Anthracite region; Evaluated coal bed methane resource potential in New Mexico and Colorado; compiled and analyzed data for USBM "Direct Method" calculation of coal bed gas contents; designed, built, and tested grinding mill for measuring "residual" gas contents in coals.

CONSULTING, SHORT COURSES, and SEMINARS:

I have performed a diverse variety of consulting services and short courses relating to coal geology, organic petrology, petroleum geology, and coalbed methane, including the following:

Alabama Securities and Exchange Commission, Montgomery Alabama
Coal Petrology Study (5/91)

Alberta Research Council, Edmonton, Alberta
Short Course Module: Generation, storage, and

migration of natural gas in coal bed reservoirs (8/90)

American Association of Petroleum Geologists—Energy Minerals Division
Co-instructor for coalbed methane short course, Calgary, Alberta (6/92)

Amoco Production Company
Source Rock Module 1-Coal Seminar: Coal as a Petroleum Source Rock (7/91)

Bowen/Edwards Associates, Inc., Denver, Colorado
Coalbed methane consulting: Coal Petrology/Geochemistry Study (3/92)

Institut Francais du Pétrole, Rueil-Malmaison, France
2-day seminar: "Gaz de Houille" (Natural Gas from Coal) (3/93)

MetFuel, Inc.; Houston, Texas
Three studies of natural fracturing and cleat mineralization (10/90; 1/91; 4/91)

Mount Isa Mines Ltd., Brisbane, Australia
Workshop on coal geology/petrology/coalbed methane (11/92)

Norcen Energy Resources, Ltd., Calgary, Alberta, Canada
Coalbed methane consulting (1990-present)

Pennsylvania State University, University Park, PA
1-day workshop on coalbed methane (6/91)

Petroleum, Inc., Wichita, Kansas
Coalbed Methane: 2-day training course (4/91); Petrographic/Geochemistry Study (3/92)

Shell Development Company Bellaire Research Center
1-day Coalbed Methane Workshop (11/90); Gas Sorption Study (12/92)

Shell Coal International Ltd., London
Coal Moisture Study (12/82)

Southern Ute Indian Tribe, Ignacio, Colorado
Coalbed Methane: Coal Petrology/Geochemistry (1988-present);

Taurus Exploration Company, Birmingham, Alabama
Coalbed Methane: Coal Petrology/Geochemistry Projects

University of Alabama College of Continuing Studies
Short Course: "Introduction to Coal Petrology with Applications to Coalbed Methane R & D": (4/89; 3/90; 9/90; 5/91)

RESEARCH GRANTS AND CONTRACTS:

Donation of Geocom Rock-Eval II and Beckman TJ-6 Centrifuge: Texaco Research Lab, $20,000, (4/86)

Coalbed methane resource evaluation for southern Tuscaloosa County, Alabama (Investigator): Alabama Department of Economic and Community Affairs, $117,000, (7/88 - 9/89).

Coalbed methane technology development in the Appalachian Basin (investigator): Gas Research Institute through Dames and Moore, Inc., $35,559, (10/89 - 9/90).

Study of coal fracture porosity via fluorescent dyed epoxy impregnation: MetFuel, $2,400. (12/90-4/91).

Permeability changes in coal resulting from gas desorption (principal investigator): DOE-Pittsburgh Energy Tech. Ctr., $137,950, (8/89-8/92).

Study of gas sorption behavior and production characteristics of selected Fruitland coals, San Study Juan basin, Colorado (Principal Investigator):

Southern Ute Indian Tribe, $24,500, (8/89 - present)

Study of gas sorption characteristics of Antrim Shale: Shell Development Co., Bellaire Research Center, $10,500, (5/92-present)

RECENT TALKS & PRESENTATIONS:

Talk: "Fault-out-of-syncline structures in the Pennsylvania Anthracite basins and their possible impact on regional coal rank patterns", Invited paper, presented at Nickelsen Symposium: Deformation Mechanisms in Fold-Thrust Belts, at 1991 Northeast/Southeast Section meeting of the Geological Society of America, Baltimore, MD, Mar. 14-16, 1991

Talk: "New methods for assessing gas resources in thin-bedded high-ash coals", presented at the 1991 Coalbed Methane Symposium, May 13-17, 1991, Tuscaloosa, AL

Talk: "The impact of oil formed during coalification on generation and storage of natural gas in coalbed reservoir systems", presented at the 1991 Coalbed Methane Symposium, May 13-17, 1991, Tuscaloosa, AL

Talk: "Compositional controls on natural gas yields from selected Fruitlands coals, San Juan basin, Colorado", presented at the Canadian Society of Petroleum Geologists, 1991 Annual Convention, June 16-19, 1991, Calgary, Alberta, Canada

Talk: "Permeability changes in coal resulting from gas desorption", presented at U.S. Department of Energy, University Coal Research Projects Meeting, June 26, 1991, Pittsburgh, PA

Talk: "Overview of Coalbed Methane Problems", Visiting delegation from People's Republic of

China, University of Alabama, Tuscaloosa, AL, Aug. 14, 1991

Talk: "Five common misconceptions regarding coalbed methane reservoir systems" U.A. Geology Department Seminar, Tuscaloosa, AL, Sept. 25, 1991

Talk: "Five common misconceptions regarding coalbed methane reservoir systems "Geology Department Seminar", presented at Eastern Coalbed Methane Forum, Sept. 26, 1991, Tuscaloosa, AL

Talk: "A gravimetric method of measuring gas sorption in coal", presented at the 8th Annual Meeting of The Society for Organic Petrology, Sept. 30-Oct. 1, 1991, Lexington, KY

Poster Presentation: "Fracture morphology of six Alabama and Wyoming coals, studied by fluorescent epoxy impregnation", presented at the 8th Annual Meeting of The Society for Organic Petrology, Sept. 30-Oct. 1, 1991, Lexington, KY

Talk: "Five common misconceptions regarding coalbed methane reservoir systems "Geology Department Seminar", presented at Western Coalbed Methane Forum, Oct. 17, 1991, Denver, CO

Symposium Chair: "Coalbed Methane: Geology, Recovery Technology, and Resources"; (GSA Coal Geology Division Symposium; co-chair with Dr. Walt Ayers, Taurus Exploration Co.), 1991 Annual Meeting of the Geological Society of America, San Diego, CA. Oct. 21, 1991

Talk: "Reservoir Heterogeneity and gas production characteristics of oil-rich Fruitland coals, San Juan basin, Colorado", presented at Symposium on Coalbed Methane: Geology, Recovery Technology, and Resources, Annual Meeting of the Geo-

logical Society of America, Oct. 21-24, San Diego, CO

Talk: "Coal rank patterns in the Cahaba coal field and surrounding areas, and their significance", presented at 1991 Annual Field Trip, Alabama Geological Society, Nov. 22, 1991, Birmingham, AL

Poster Session: "Fracture morphology of six Alabama and Wyoming coals, studied by fluorescent epoxy impregnation", presented at the Natural Fracture Workshop, University of Texas Bureau of Economic Geology, Austin, June 11, 1992

Invited Keynote Address: "Relationship of the molecular fraction of coal to measurements of porosity and density: Implications regarding the role of coal as a petroleum source rock and reservoir", presented at 1992 meeting of the International Committee for Coal and Organic Petrology (44th), University Park, PA, July 19-23, 1992.

Field Trip: "The Anthracite basins of eastern Pennsylvania": Field trip for the 1992 Joint Meeting of the International Committee for Coal and Organic Petrology (44th) and The Society for Organic Petrology (9th), July 25, 1992 (co-lead with Jane R. Eggleston).

Invited Keynote Address: "Influences Of Coal Composition On Coal Seam Reservoir Quality In U.S. And Australian Basins: A Review", "Symposium on Coalbed Methane Research and Development in Australia", Townsville, Queensland, Australia, Nov. 19-21, 1992.

Invited Keynote Address: "Relationship of the Molecular Fraction of Coal to Measurements of Porosity and Density: Implications for Coal as a Source and Reservoir Rock" ARCO Symposium on Coal, Plano, TX, April 30, 1993.

SELECTED ABSTRACTS:

Levine, J.R. and Davis, A., 1982, Structural evolution of the Western Middle field synclinorium, Pennsylvania, using coal reflectance: Geological Society of America Abstracts with Programs, v. 15, no. 7, p. 546.

Levine, J.R., Paxton, S.T., and Davis, A., 1984, Controls of regional coal rank variation, Anthracite coal fields, Pennsylvania, U.S.A.: The Geological Society and the Mineralogical Society, Meeting on Diagenesis and Low Temperature Metamorphism, Bristol, U.K., April, 1984.

Levine, J.R., 1985, Interpretation of Alleghanian tectonic events in the Anthracite region, Pennsylvania, using aspects of coal metamorphism: Geological Society of America Abstracts with Program, v. 17, p. 31.

Levine, J.R. and Hesse, R. 1985, Origin of fracture-hosted hydrocarbon residues in Taconian nappe sequence near Quebec City: Geological Association of Canada and Mineralogical Association of Canada Joint Annual Meeting, Program with Abtracts, v. 10, A-34.

Levine, J.R., 1986, Diachronous Alleghanian deformation of coal-bearing strata in Pennsylvania, interpreted from patterns of coal rank and reflective anisotropy: 1986 Annual Meeting of The Society for Organic Petrology, Lexington, KY

Levine, J.R., 1987, The influence of rank, grade, and petrographic composition on coal bed natural gas reservoirs: Abstracts and Program, 4th Annual Meeting of The Society for Organic Petrology (San Francisco, CA, Sept. 30-Oct 3, 1987), p. 56.

Levine, J.R. and Davis, A., 1989, Reflective anisotropy of Carboniferous coals in the Appalachian

foreland basin, U.S.A.: Abstracts, 28th International Geological Congress (Washington, D.C., July 9-19, 1989), v. 2, p. 288.

Levine, J.R. and Tang Y., 1989, Secondary porosity in coal and its relationship to coal metamorphism: Coal Meeting '89, Orleans, France (Sept. 12-15, 1989).

Levine, J.R., 1990, Quantitative estimation of volatile yields from coal released during organic maturation: American Chemical Society, Division of Geochemistry Preprints, Proceedings of 199th ACS National Meeting, Boston, MA, Abst. #28.

Levine, J.R., Thompson, D.A., and Telle, W.R., 1990, Coalbed gas resources of Upper Pottsville Fm. near Duncanville, AL: Geol. Soc. of America Abstracts with Programs, v. 22, p. 23.

Tang Y. and Levine, J.R., 1990, Secondary pores in coal: their formation and relationship to coal macerals, Pingdingshan-Jiaosuo coal fields, China: Proceedings, 7th Annual Meeting of The Society for Organic Petrology, Calgary, Alberta, Sept. 8-14, 1990.

Levine, J.R., 1991, Fault-out-of-syncline structures in the Pennsylvania Anthracite basins and their possible impact on regional coal rank patterns: Geological Society of America Abstracts with Programs, v. 23, p. 59.

Levine, J.R., 1991, Compositional controls on natural gas yields from selected Fruitland coals, San Juan basin, Colorado: Canadian Society of Petroleum Geologists, Programme and Abstracts, 1991 CSPG Convention, June 16-19, 1991, Calgary, Alberta, Canada, p. 93.

Levine, J.R., 1991, Fracture morphology of six Alabama and Wyoming coals, studied by fluorescent

epoxy impregnation: Proceedings, 8th Annual Meeting of The Society for Organic Petrology, Lexington, KY

Levine, J.R., Johnson, P.M., and Prakash, G., 1991, A gravimetric method of measuring gas sorption in coal: Proceedings, 8th Annual Meeting of The Society for Organic Petrology, Lexington, KY

Boyce, B.C. and Levine, J.R., 1991, Reservoir heterogeneity and gas production characteristics of oil-rich Fruitland coals, San Juan basin, Colorado: Geological Society of America Abstracts with Programs, v. 23, no. 5, p. A39.

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ARTICLES AND PAPERS

McCulloch, C.M., Levine, J.R., Kissell, F.N., and Duel, M., 1976, Measuring the methane content of bituminous coalbeds: U.S. Bureau of Mines Report of Investigations 8043, 22 p.

Diamond, W.P. and Levine, J.R., 1981, Direct method determination of the gas content of coal: procedures and results: U.S. Bureau of Mines Report of Investigations 8515, 36 p.

Levine, J.R., 1983, Comment on "Time-temperature-burial significance of Devonian anthracite implies former great (— 6.5 km) depth of burial of Catskill Mountains, New York": Geology, v. 11, 122-123.

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Cotter, E., eds., Silurian Depositional History and Alleghanian Deformation in the Pennsylvania Valley and Ridge: Guidebook for the 48th Annual Field Conference of Pennsylvania Geologists, PA Bureau of Topographic and Geologic Survey, p. 67-73.

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Levine, J.R., 1987, Influence of coal composition on the generation and retention of coalbed natural gas, in Proceedings of the 1987 Coalbed Methane Symposium, Tuscaloosa, Alabama, Nov. 16-19, 1987: Gas Research Institute, p. 15-18.

Levine, J.R., 1987, Review of "Geochemistry in Petroleum Exploration" by Douglas Waples: Jour. Geol. Education, v. 35, p. 286-287.

Levine, J.R., and Slingerland, R., 1987, Upper Mississippian to Middle Pennsylvanian stratigraphic section, Pottsville, Pennsylvania, *in* Roy, D.C., ed., Northeastern Section of the Geological Society of America, Centennial Field Guide v. 5: Geological Society of America, Boulder, Colorado, p. 59-63.

Levine, J.R. and Hesse, R., 1987, Characteristics and origin of fracture-hosted impsonite, Quebec City area, Canada: Organic Geochemistry, v. 11, p. 425-426.

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Levine, J.R., 1989, Review of "Organic Metamorphism and Geothermal History: Microscopic study of organic matter and thermal evolution of sedimentary basins" by Paul Robert: Journal of Geologic Education, v. 38, p. 65.

Levine, J.R., Thompson, D.A., Telle, W.R., and Thomas, J.N., 1989, A coalbed methane resource evaluation in southern Tuscaloosa County: Alabama: Tuscaloosa, Alabama, The University of Alabama School of Mines and Energy Development Research Rep. 89-1, 90 p.

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IN THE UNITED STATES DISTRICT COURT
DISTRICT OF COLORADO

[Caption Omitted]

AFFIDAVIT OF DR. HARRY MARSH

Dr. Harry Marsh, being of lawful age and duly sworn, states as follows:

1. *Qualifications.*

1.1 I am a chemist. I hold Ph.D. and D.Sc. degrees. A copy of my resume is attached as Exhibit 1.

1.2 I presently hold the position of Distinguished Visiting Professor in the Department of Mechanical Engineering and Energy Processes at the University of Southern Illinois in Carbondale, Illinois. I have held this position since 1991. I am also Emeritus Professor in Carbon Science in the Department of Chemistry at the University of Newcastle upon Tyne in the United Kingdom. I have been the Director of the Northern Carbon Research Laboratories at the University of Newcastle upon Tyne. I have written 239 papers published in refereed journals, including the journals Fuel, Carbon, Journal of Materials Science, Journal of Colloid and Interface Science, and Erdol und Kohle. I have written 7 book chapters. I have written 186 extended abstracts for a variety of scientific conferences. I have edited the book "Introduction to Carbon Science."

1.3 My research experience has been in the area of carbon science. Within this field, I have placed special emphasis on:

1.3.1 *Carbonization theory:* coals, pitches, resins and woods.

1.3.2 *Adsorption and surface chemistry:* including porosity and surface functionality of coals, active carbons and graphites.

1.3.3 *Gasification/oxidation/hydrogasification:* including kinetics and surface typography of gasification by oxygen, carbon dioxide, hydrogen and atomic oxygen.

1.3.4 *Structural analyses:* including X-ray and electron diffraction, optical texture, transmission electron microscopy and scanning electron microscopy.

1.3.5 *Composites:* including metallurgical cokes and carbon-fibre systems.

1.4 I have devoted a substantial portion of my career to the study of coal. My research about coal has included:

1.4.1 Microporosity in coals: critical assessments of adsorption phenomena in all ranks of coals.

1.4.2 Macro-molecular structure of coals.

1.4.3 Surface functionality in coals.

1.4.4 Coal carbonization and co-carbonization (hydrogen transfer theory and the concept of liquid crystals).

1.4.5 Combustion of coal.

1.4.6 Effects of igneous intrusions into coal seams.

1.4.7 Effects of coal charge pre-heating in cokeries.

2. *Objectives.*

The objective of this affidavit is to provide an overview of the structure of coal from the perspective of a chemist. As will be discussed in more detail below, coal is universally regarded as an extremely complex and heterogenous substance. The mechanisms and forces by which the various constituents of coal are held together are summarized.

The origin of coal and its constituent parts is also summarized.

3. *Definitions and Background.*

When describing coal structure, some specialized terminology is used. Definitions of these terms follow. Although one of the purposes of this affidavit is to provide a detailed description of the chemical and physical structure of coal, it may be useful to begin with some general definitions of coal.

3.1 *Coal.*

3.1.1 "Coal—a readily combustible rock containing more than 50% by weight and more than 70% by volume carbonaceous material, including *inherent moisture*[1], formed from compaction and induration of various plant remains similar to those of peat. Differences in kinds of plant materials (type), in the degree of metamorphism (rank), and in the range of impurity (grade) are used in classification." (emphasis added) American Geological Institute, DICTIONARY OF GEOLOGICAL TERMS (1980).

3.1.2 "Coal is a sedimentary rock accumulated as peat, composed principally of macerals and subordinately of minerals, and containing water and gases in submicroscopic pores." R.N. Neavel, "Coal Structure", Ed. M.L. Gorbaty and K. Ouchi, American Chemical Society, Advances in Chemistry Series, 192, American Chemical Society, Washington, DC, (1981), p. 1.

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1 "Inherent" is defined as "existing in someone or something as a permanent and inseparable element, quality or attribute; innate; ingrained." Random House, WEBSTER'S COLLEGE DICTIONARY, p. 693 (1991).

3.2 *Basic Concepts of Chemistry and Physics.* It may be helpful to review some basic principles of chemistry and physics:

- Matter can be classified according to its physical state (solid, liquid or gas) or according to the nature of its composition (element, compound or mixture).
- Matter can undergo three kinds of changes: chemical, physical and nuclear. Examples of chemical changes are the burning of gasoline, digestion of food or producing plastic from petroleum. When chemical changes occur, the original atoms are preserved, but a new substance with a different chemical composition has formed, i.e., the atoms have been rearranged into new combinations. The boiling of water, melting of ice and the distillation of alcohol are examples of physical changes. In these reactions, the chemical composition of the substances involved remains the same, but the physical form changes.
- An element is a substance composed of atoms having an identical number of protons in each nucleus. Elements cannot be reduced to simpler substances by normal chemical means. There are approximately 109 known elements.

3.3 *Compounds, Molecules and Mixtures.* A compound is made up of two or more elements which have combined together chemically to form the compound. Such substances as water, sugar and salt are compounds. Substances such as milk, paint, ink, air and muddy water are mixtures containing compounds. When mixtures are created from the component compounds no chemical reactions occur. The process of mixing is physical in nature. Mixtures do not have a meaningful chemical composition because the concentrations of the component compounds can vary. Mixtures can be separated into their individual constituents by physical means, e.g., filtration, distillation, crystallization, etc. Mixtures may be comprised of constituent substances in different physical states, i.e., a mixture may contain solids, liquids and gases.

3.4 *Organic Compounds.* The element carbon has the unique ability to form a virtually infinite number of compounds with hydrogen, oxygen, sulfur and nitrogen. About 6,000,000 such compounds, called organic compounds, are known. Coal is an organic material, not a single compound, composed dominantly of carbon-carbon (-C-C-) and carbon hydrogen (-C-H) bonds, and is combusticle.

3.5 *Hydrocarbons.* A hydrocarbon is an organic compound composed of carbon and hydrocarbon only. The simplest hydrocarbon is methane CH_4 (I), a larger hydrocarbon molecule is octane, C_8H_{18} (II) and a ring hydrocarbon is cyclohexane, C_6H_{12} (III).

3.6 *Aromatics.* An organic aromatic compound contains one or more six-membered rings of bonded carbon atoms. Such ring structures are relatively very stable. The simplest aromatic compound is benzene (IV), and a three-membered ring is phenanthrene (V).

3.7 *Coalification.* Coalification is the physical and chemical process by which peat is transformed into coal over geologic time. Coalification is discussed in more detail in Section 4 below.

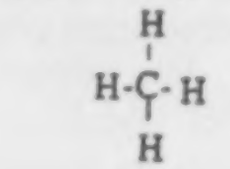
3.8 *Macerals.*

3.8.1 In lay terms, portions of plant material are changed chemically and physically, during the coalification process, into coal macerals. There are different types of macerals which can be distinguished upon microscopic examination. They are classified by the type of plant material from which they originated. For example, the most common class of maceral is vitrinite and is derived from woody plant material.

3.8.2 Coal macerals are chemically complex and contain, among other things, high molecular weight hydrocarbons.

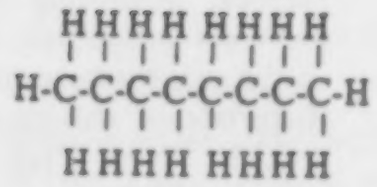
3.8.3 "Macerals are organic substances derived from plant tissues, cell content and exudates that were variably subjected to decay, incorporated into sedimentary strata and then altered physically and chemically by natural (geologic) processes." R.N. Neavel, "Coal Structure", Ed. M.L. Gorbaty and K. Ouchi, American Chemical Society, Advances in Chemistry Series, 192, American Chemical Society, Washington, DC, (1981), p. 1.

Methane (CH_4)



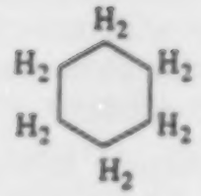
(I)

n-Octane (C_8H_{18})



(II)

Cyclohexane (C_6H_{12})

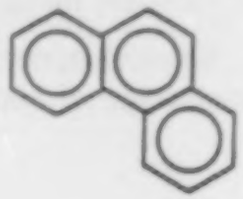


(III)

Benzene (C_6H_6)

(IV)

Phenanthrene ($C_{14}H_{10}$)



(V)

3.8.4 "Coal macerals evolve from the different organs or tissues of the initial coal-forming plant materials during the course of the first stage of coalification. However, because of variable but severe alteration, it is not always possible to recognize the starting materials. Macerals are the microscopically recognizable individual constituents of coal and depending on their quantitative participation and their association, they control the chemical, physical and technological properties of a coal of given rank." International Commission for Coal Petrology (ICCP).

3.8.5 "Macerals are organic substances, or optically homogeneous aggregates of organic substances, possessing distinctive physical and chemical properties, and occurring naturally in the sedimentary, metamorphic, and igneous materials of the earth." William Spackman (1958). New York Acad. Sci., Ser. II, *20* (5), p. 411-423.

3.8.6 Optical micrographs of polished surfaces of several different coal macerals are shown in the color photographs of Figures 1 through 6 of this Affidavit.

3.9 *Mineral Matter.* Mineral matter in coal is the inorganic constituent of coal and is not combustible. Mineral matter is estimated by the low temperature ashing process (LTA), 300°C, in which the organic constituent of coal is combusted in atomic oxygen. Ash is the residue remaining after complete combustion of the organic constitutent of coal, in air at about 900°C. Mineral matter and ash are not identical materials.

3.10 *Porosity.* Coal is a porous material. Stated another way, a characteristic of coal is porosity. Porosity is

the volume element within a solid of zero electron density. In lay terms, porosity is space within a solid. In a macromolecular substance like coal, porosity results from the irregular stacking of constituent molecules. (See Figure 7). Another example of a porous material is wood. Pores come in three categories of sizes: Micropores, mesopores and macropores. This terminology is universally accepted, and defined in International Union of Pure and Applied Chemistry, Pure and Applied Chemistry, 1985, *57*[4], 603-609.

3.10.1 *Micropores.* Micropores are less than 2 nanometers (nm) in width, and have the dimensions of molecules. (A nanometer is a billionth of a meter.)

3.10.2 *Mesopores.* 2 to 50 nm in width.

3.10.3 *Macropores.* Greater than 50 nm in width.

Most of the porosity in coal is microporosity.

3.11 *Moisture.* Coal contains water. The coalification process generates water. Water is part of coal structure. As noted above, many definitions of coal refer to its moisture content. The moisture-holding capacity of a coal is the amount of moisture that a coal will hold when it is in equilibrium with an atmosphere saturated with water vapor (100% relative humidity). "Equilibrium moisture", "moisture-holding capacity", "bed moisture", and "inherent moisture" are all terms used to describe the moisture content of a coal as it would be in a seam. These terms are syonymous. W.J. Montgomery, "Analytical Methods for Coal and Coal Products", Ed. Clarence Karr, Jr., Academic Press, New York, 1978, Vol. 1, p. 200.

3.12 *Coalbed Methane.* Coal contains methane.

3.12.1 Coalbed methane is a constituent of coal being held dominantly within the microporosity of coal by forces of adsorption at high pressures.

3.12.2 Coalbed methane is generated within coal along with the other constituents of coal during the coalification process.

3.12.3 Coalbed methane is not composed of only methane. It is a mixture of gases, dominantly methane, and may also include nitrogen, carbon dioxide, and propane.

3.12 *Adsorption.* Adsorption is the property of a surface between two immiscible phases (usually between a gas and a solid) to attract molecules to that surface and create a concentration much greater than would exist in the absence of the surface. Adsorption is a basic thermodynamic property of surfaces resulting from a discontinuity in intermolecular or interatomic forces. The adsorbent is the solid which adsorbs. The adsorbate is the gas which is adsorbed. Adsorption can be physical in nature, i.e., no covalent bonds occur between the adsorbent and the adsorbate. Some materials may adsorb chemically, i.e., covalent bonds are formed between the adsorbent and the adsorbate. Adsorption, specifically of coalbed methane, is discussed in more detail in Section 6 below

4. *Coalification.*

4.1 *Introduction.* Coal originated from plants. The debris of sinking swampy forests formed, largely under the action of bacteria, large peat deposits. This is referred to as the biochemical phase. The next phase is geochemical. It lasts hundreds of millions of years. Burial beneath overlying sediments increases temperature and pressure. Over time, these factors transform peat into lignite, then bituminous coal and then anthracite. This process is simplied as modeled in Figure 8. The coalification process moves towards formation of graphite, that is, the most thermodynamically stable form of carbon.

4.2 *Coal Rank.* As the coalification process progresses, coal increases in rank. For example, lignite is

more "mature" and of higher rank, than peat. Bituminous coal is more mature and of higher rank than lignite. Anthracite is more mature and of higher rank than bituminous coal. The coals in the Fruitland formation underlying the Southern Ute Indian Reservation are bituminous coals.

4.2.1 As coal rank increases, the content of certain elements within the coal changes. As coal matures, carbon content increases, hydrogen content decreases and oxygen content decreases.

4.2.2 As coal matures, i.e., as rank increases, methane content also increases. Stated another way, as a general rule, the higher the rank of the coal, the higher the methane content will be, as set out in Figure 9.

4.3 *The Generation of Molecules of Water and Methane within Coal.*

4.3.1 The chemistry of coalification creates water and methane molecules internally within the coal. The space these generated molecules occupy within the coal will be slightly larger than the space the constituent atoms occupied when previously attached to the macromolecular network. Thus, there must exist within the coal high internal generative pressures, matching the tectonic and overburden pressures on the coal seam. Usually, most of the generated methane stays within the coal for the entire coalification period. Before mining, the coal contains no unfilled microporosity. This microporosity, in mined and desorbed coal, is created by the methane and is the volume it occupied during coalification. If the methane had desorbed during coalification it can be strongly suggested that the macromolecular structure would have densified further and would not contain microporosity.

4.3.2 The same processes of coalification that produced coal macerals produced coalbed methane and water.

4.3.3 Coalbed methane was derived from the same organic substances that gave rise to coal macerals.

4.3.4 The coal generates water and methane in excess of its ability to contain all of these compounds within itself. Some methane is lost to the surrounding strata. But at pressures of about 1,000 atmospheres, about 80% of generated methane can still be retained within the coal.

4.3.5 In terms of geological time, say 100,000,000 years, there is time enough for the methane to diffuse out of the coal into surrounding porous strata, provided the strata is porous (permeable). The fact that it does not indicates (a) that the methane is essentially sealed within the coal itself, or (b) that the surrounding strata are totally impermeable. The former is the most probable.

4.3.6 So, methane generated within coal stays there forever unless a major disturbance occurs, either geological or man-made.

4.3.7 In one sense, the methane is dominantly "gridlocked" within the coal structure. It cannot move to an adjacent microporous site (diffusion) because all adjacent sites are themselves occupied at all times. Stated another way, coalbed methane is located primarily within the macromolecular structure of macerals.

4.3.8 The locations of moisture (water) within coal are similar to those of methane.

4.3.9 Methane in coal could not have originated from a source rock some distance from the coal seam, and later have become adsorbed within the coal.

4.3.9.1 To do so, the methane pressure in that source rock must have been higher than the pressure of methane in the coal seam.

4.3.9.2 There must have been a single direction of movement from the source rock to the coal seam. There must be no other random diffusion pathways.

4.3.9.3 There must be access to the coal seam, from the source rock, over areas of many square miles.

4.3.9.4 The coal seam must have lost its methane previously in order to have an available adsorption capacity for methane from a rock source.

4.3.9.5 But having lost its adsorption capacity in the first place it will not change to become a methane-retaining coal. If the methane subsequently cannot come out, it could never have gone in, in the first place.

5. *Coal Structure.*

5.1 Coal is an agglomerate of physically held materials. These agglomerated materials include:

5.1.1 Macerals

5.1.2 Mineral matter

5.1.3 Moisture

5.1.4 Gases (including methane, carbon dioxide and hydrogen sulfide)

5.2 Coal is not composed of a single chemical compound. Rather, it is a eterogenous substance made up of many different types of organic chemical materials, some of them quite complex. Not all the constituents of coal are covalently or ionically (chemically) bonded to one another. Many of the constituents of coal are bound together by physical, not chemical, forces. The structure of coal cannot be fully understood if one ignores its macromolecular, heterogenous nature. Likewise, coal cannot be understood if one ignores the role of physical bonds in its structure and composition.

5.3 *Structure in Atoms and Molecules.*

5.3.1 Small atoms such as helium, argon, etc. behave as though they were small magnets, and can attract each other. These attractions are small compared to some other types of bonds

and are the Van de Waals' forces. In such atoms the polarity of the magnets is not constant, but oscillates very rapidly. These oscillations do not cancel totally and all atoms and molecules possess this 'residual' type of interaction, see Figure 10.

5.3.2 Other molecules, such as nitrogen (N_2), possess two magnets within their structure and these are known as quadrupoles. The forces between these molecules are stronger than for the atoms of helium or argon. In the presence of force fields from other molecular systems dipoles and quadrupoles can be induced in some molecules, for example carbon dioxide, see Figure 11.

5.3.3 On the other hand, some molecules have dipoles which are permanent within the molecule. Two simple examples, but of overwhelming importance to the existence of life, are water and ammonia. The dipole of the water molecule creates 'polymeric', or cage-like water structure which maintains the liquid phase, see Figure 12.

5.4 *Bonding Between Atoms and Molecules.*

5.4.1 *Chemical v. Physical Bonds. Chemical bonding* involves electron transfer or sharing atom with atom. They are the strongest of the bonds. *Physical bonding* is the least energetic of bonding or attraction between atoms and molecules. It results solely from the above mentioned van der Waals' forces. No electrons are transferred or shared. As an example, using water, H_2O, there is chemical bonding between the hydrogen and oxygen atoms (electron sharing). The bonding or attraction between the water molecules themselves (resulting in liquid water or ice) is physical in nature.

5.4.2 *Covalent Bond.* Primary chemical bond formed by the sharing of electrons of the bonded atoms such as the carbon atoms in graphite or diamond. Such bonding is characterized by strong directional bonding. Bond energies are >200 kJ mol^{-1} (>50 kcal mol^{-1}).

5.4.3 *Ionic Bond.* Primary chemical bond formed by the transfer of electron(s) from the shell of one atom to the shell of a second atom, the atoms being of widely differing electronegativities. Such bonding is characterized by a lack of directional bonding. Bond energies are >200 kJ mol^{-1} (>50 kcal mol^{-1}).

5.4.4 *Hydrogen Bond.* Secondary valence bond between a hydrogen atom in one molecule and oxygen, nitrogen or fluorine atom in another molecule (intermolecular bonding). These bonds may also exist between hydrogen atoms in one location and oxygen, nitrogen, or fluorine atoms in another location in the same molecule (intramolecular bonding). Intermolecular hydrogen bonds are responsible for the high strength of fibers, of polymeric types of materials and for the stability and functioning of life molecules. Bond energies are <40 kJ mol^{-1} (<10 kcal mol^{-1}).

Hydrogen bonding is secondary bonding and involves no electron transfer as in primary bonding (covalent or ionic). Intermolecular hydrogen bonds are responsible for the high strength of fibers. An example of intramolecular hydrogen bonds is the helices found within organic molecules like starch and globular proteins (life molecules).

5.4.5 *London Forces or Dispersion Forces.* Secondary transitory dispersion forces resulting from induced dipole induced dipole interaction. London or dispersion forces are secondary forces and involve no electron transfer, see Figure 10.

5.4.6 *van der Waals' Forces.* Forces based on attractions between groups in different molecules or in different locations in the same molecule. This term is not used rigorously. Rather it is often used to include all types of physical bonding, dispersion forces, quadruple, and dipole interactions and hydrogen bonding (which is a form of dipole interaction). In graphite the carbon atoms within a plane are bonded chemically, covalently. However, the layers are bonded between themselves by a form van der Waals' bonding, by interaction of the π-electron orbitals, without electron transfer. This weak bonding allows the layers of graphite to slip over each other. Hence, graphite is a lubricant.

5.4.7 *Bond Lengths.* Bond length is the distance atom center to atom center. The bond lengths of primary bonds are usually about 0.09 to 0.2 nm (0.90 to 2.0 A[2]), with, for example, the carbon-carbon bonding length being about 0.15 to 0.16 nm (1.5 to 1.6 A). With secondary bonding, interactions occur over distances of 0.25 to 0.5 nm (2.5 to 5 A).[3]

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[2] The symbol "A" is for angstrom. An angstrom is one hundred-millionth of a centimeter.

[3] It should be borne in mind that the size of microporosity is less than 2 nm in width. Thus, the largest micropore is only 4 to 8 times greater in diameter than the length of a hydrogen bond and as little as 10 times greater in diameter than the length of a covalent or ionic bond.

5.5 Bituminous coal macerals consist of three-dimensionally cross-linked macromolecules. The building blocks of these macromolecules are aromatic rings. Aromatic rings consist of six carbon atoms bound in a hexagonal shape with a hydrogen atom bound to each carbon atom. A common aromatic ring is benzene (molecule (IV), page 4). Two or three aromatic rings join together to form an aromatic ring cluster. These aromatic ring clusters are connected by aliphatic carbon bonds into a disordered macromolecular network with incomplete filling of spaces between the systems (see Figures 13 through 19). These spaces are microporosity.

5.6 It is necessary to consider coal as being macromolecular in nature.

5.7 The macromolecular structure of vitrinite is not homogenous throughout. There appear to be variations in intensity of bonding throughout the macromolecular structure. These variations in bonding intensity or atom density or microporosity occur continuously over distances of nanometers. Above this, an individual maceral shows variations over much longer distances, of micrometers, associated with origins from different parts of the plant material. As water and methane molecules are products within the structure at positions of their formation, they prevent the macromolecular structure from becoming more stable, more homogenous, and more dense. In other words, water and methane molecules are not simply separate or additional products of coalification. They have a prime role in influencing the development of the macromolecular structure. Water and methane molecules originated from the same macromolecular structure of the precursors of coal macerals. They remained within and influenced the development of macromolecular structure of bituminous coal macerals.

5.8 A two-dimensional model of the macromolecular system of a coal maceral is shown in Figure 13 (Shinn model). A three-dimensional model is shown in Figure

14 (Spiro model). It must be borne in mind that there is no "average" maceral molecule because coal is so heterogenous in structure. Thus, any model radically oversimplifies the molecular and structural heterogeneity of coal macerals.

5.9 Figure 15 is the two-dimensional Shinn model of the macromolecular system of a coal maceral with some aromatic ring clusters highlighted.

5.10 Figure 16 is the two-dimensional Shinn model of the macromolecular system of a coal maceral with the structural chemical composition of the surface of the microporosity highlighted.

5.11 Figure 17 is the two-dimensional Shinn model of the macromolecular system of a coal maceral with the porosity highlighted.

5.12 Covalent bonds exist within the macromolecular structure of coal macerals. However, non-covalent physical interactions are important components of the chemical structure of coal macerals.

5.13 Figure 18 is a simple three-dimensional model of a macromolecule of a coal maceral to illustrate that the bonding between the molecular structure is not intense. Further, the bonding is dominantly of two forms. There are the strong directional covalent bonds between atoms. There are also the non-directional hydrogen bonding between hydrogen and other components of coal.

5.14 Figure 19 is a model of the macromolecular structure of a coal maceral (generated using computer graphics) using the space-filling technique to indicate relative positions of hydrogen and carbon atoms, etc. Because the packing is not close, the microporosity is within this model, but not easily seen.

5.15 Figure 14 (Spiro model) shows a portion of the structure of the macromolecular structure of a coal maceral. If many of these portions were stacked together, the

resulting imperfect stacking would create the microporosity.

5.16 The bonding density within the macromolecular structure of coal macerals is not high; there is flexibility, limited rigidity, such that the structure can be manipulated.

5.17 Water in coal is a structural component. Removing water from coal changes structure and bonding. This concept is introduced in section 4.3.1. Water molecules and coal are located at positions of oxygen functionality within the macromolecular structure where the forces (energies) of physical adsorption are highest. When water is removed from the coal, either by warming or by evacuation, the macromolecular structure collapses on to itself, and will further bond within itself by hydrogen bonding and chemical bonding at locations previously occupied by the water molecule. This new bonding is irreversible. Hence, mined and dried coal is a different material compared with the unmined coal still with its inherent moisture.

5.18 Water exists in coal in several states:

5.18.1 As physically adsorbed in microporosity the surfaces of which is free from groupings capable of forming hydrogen bonds.

5.18.2 As physically adsorbed in microporosity the surfaces of which contain various groupings capable of forming hydrogen bonds.

5.18.3 As water derived from the chemical decomposition of oxygen-containing groups on the macromolecular surface (e.g., OH- radicals). This water is not "chemisorbed" in the proper sense because it does not exist as water in the first place.

5.18.4 As water of hydration associated with the mineral matter in coal, e.g., clays.

5.18.5 As bulk water outside the microporosity but within fractures of the coal, or other porosity in the coal greater than 50 nm in width. The properties of this water are essentially those of water as seen in a glass, for example.

5.19 Hydrogen bonding, usually between atoms and oxygen atoms, of the order of < 40 kJ mol^{-1}, is extensive. As with proteins and other polymeric (macromolecular) systems, e.g. cellulose, lignin, the stability of structure is established by many hydrogen bonds (of low energy) as distinct from few covalent bonds of high energy, relatively.

5.20 Methane in the microporosity of coal macerals was generated and influences macromolecular structure in fundamentally the same ways as water does. Both interact with the macromolecular structure in the same ways. In other words the nature of the interactions between methane and water and the macromolecular structure of coal macerals is fundamentally the same. The only difference is in the energetics of those interactions. Water is more interactive with the macromolecular structure than is methane.

5.21 A coal maceral, e.g. vitrinite, is macromolecular in nature. But it is not homogenous. Parts are more strongly bonded together, physically and chemically, than other parts. This is true for all levels of heterogeneity, e.g., between components of vitrinite associated with different plant component origins. This type of heterogeneity shows up by selected chemical, analytical techniques, e.g. nuclear magnetic resonance (NMR). The differently bonded components are called immobile (strongly bonded) and mobile (weakly bonded) phases. The weakly bonded phases can be extracted by solvents. Some of these weakly bonded phases may in fact behave as individual molecules, not part of the macromolecular chains, and are called oils.

5.22 *Comparing Coal* in situ *with Coal in a Laboratory*. It is not scientifically acceptable to take the results

and conclusions of coal experiments conducted in a laboratory and apply them uncritically to the *in situ* situation of coal in a coal seam. Bituminous coal seams typically exist at temperatures of about 80°C and pressures up to about 1,000 atmospheres (100 MPa). Under these conditions, there is very little volume of free methane. The conditions of moisture and methane within *in-situ* coal are unique to this undisturbed state. It is well established that removing moisture from *in-situ* coal brings about a change in coal structure which cannot be restored, see section 5.17. Therefore, moisture in in-*situ* coal is NOT in equilibrium with moisture external to the coal as it would be in a laboratory experiment. This is because the structure/bonding within the two coals is now different. The physical conditions of a laboratory coal adsorption experiment do not simulate the conditions in a coal seam. First, the moisture and methane in *in-situ* coal were generated along with and as part of the macerals. This generation is an irreversible process. Second, removal of moisure and methane from coal as it is removed from a coal seam is an irreversible process. Third, the physical conditions of a laboratory adsorption experiment with its large volume of available gaseous adsorbate, and the use of a tiny sample of coal (0.1 gram) do not simulate the conditions in a coal seam. In a laboratory experiment, the diffusion conditions differ significantly from those in a coal seam.

5.23 Studying the structure of coal reveals it to be an extremely complex and heterogenous material. The various substances which comprise coal are primarily physically bonded together. Thus, if one were to remove from coal all materials which are physically bonded into it, in the end nothing would remain.

5.24 A microscopy examination has been made of a core sample of Valencia Canyon coal from the San Juan basin in Colorado. The report of this examination, including micrographs and explanatory notes, is attached to this Affidavit as Exhibit 2.

The bulk fracture surfaces of this coal were initially photographed, and color photographs obtained. The coal was micronized (ground) to a size of less than about 10 μm. This sized coal was then subject to the process of density gradient separation using the centrifuge approach. The ground coal is made into a slurry with a solution of cesium chloride, with a density of 1.18 g cm^{-3}. As the macerals within coal have different densities, then the heavier (more dense) fraction will tend to sink to the bottom of the slurry and the lighter (less dense) fraction will float. Left to settle out without the influence of centrifugal forces, the separation process would take an impossible long time.

Therefore, the slurry was placed into centrifuge tubes and subjected to a centrifugal separation, *i.e.*, a process of spinning. After an appropriate time the heavier component moved to the bottom of the tube and that fraction of lower density stayed further up the tube. Hence, the coal can be separated into two fractions by selective siphoning. These fractions are called:

FLOAT: Density less than (<) 1.18 g cm^{-3}, made up of the liptinite (resinite, sporinite) macerals.

SINK: Density greater than (>) 1.18 g cm^{-3}, made up of the maceral vitrinite.

Scanning Electron Microscopy (SEM)

The particles of coal, after micronization, were examined by SEM. This form of microscopy images the three-dimensional appearance (shape) of the particles and these can be photographed in black and white. Both the float and sink particles were so photographed, at a microscope mignification of 5,000x. The print magnification is 10,000x.

Optical Microscopy.

This technique examines polished surfaces of the coal using polarized light, both white light and U.V. fluorescent light.

Because different macerals reflect white light differently, then the macerals within the coal surface are clearly distinguished from each other, in terms of shades of gray.

Using the conditions which generate fluorescence within the coal sample, then such macerals as resinite, because they fluoresce with a yellow/orange light, are clearly distinguishable from vitrinite, which does not fluoresce.

Polished surfaces were prepared from:

(a) pieces about 1 cm in size, of the unground coal,

(b) particles of the float fraction,

(c) Particles of the sink fraction,

Images as seen within the microscope were photographed using 200 ASA Kodacolor film and color prints obtained and reproduced within this report (Exhibit 2). The many components of coal are clearly visible. The print magnification is 600x.

Low Temperature Ashing

The objective of this experiment was to obtain a sample of the mineral matter as it exists within the coal particles. The micronized coal was placed within a LOW TEMPERATURE ASHING FURNACE and oxidized in atomic oxygen. This gas oxidizes (burns) the organic matter of the coal and leaves behind the mineral matter as it exists within the coal, without change. It is obtained as very fine brownish powder. It was subject to an X-ray examination and found to be made up of quartz and clay, primarily.

A further sample of the mineral matter was examined by SEM and its shape or morphology photographed as reproduced within this report.

The samples of bulk coal, micronized coal, coal macerals, and mineral matter constitute Exhibit 3.

6. *Adsorption of Coalbed Methane.*

6.1 Physical adsorption, or physi-sorption, is a process whereby a solid surface "attracts" molecules to that surface by physical forces to create a concentration there much greater than in the absence of the surface. See Figures 20a, 20b. Examples of the physical forces which may be involved in physical adsorption are hydrogen bonding and van der Waals' forces.

6.2 Chemical adsorption, or chemi-sorption, is a process whereby a solid surface "attracts" molecules to that surface by chemical forces to create a concentration there much greater than in the absence of the surface. Examples of the chemical forces which may be involved in chemical adsorption are covalent and ionic bonds.

6.3 Figures 21a, 21b illustrate some basic definitions. Adsorptive, usually a gas, is this substance before it is absorbed, being still in the gas phase. Adsorbent is the substance which adsorbs, e.g., a solid. Adsorbate is the substance which is adsorbed, e.g., a liquid or gas.

6.4 Smooth solid surfaces are not of interest to chemists who study adsorption. That is because smooth surfaces are rare. Figure 22 illustrates adsorption on an irregular surface.

6.5 Smooth solid surfaces do not exist in coal. Coal involves adsorption on irregular surfaces. Most of the surface area within coal is the surface of the microporosity.

6.6 Physical adsorption can result in multiple molecular layers of adsorbate attached to the surface of the adsorbent. Chemical adsorption can result in only a single layer of molecules of adsorbate attached to the surface of the adsorbent.

6.7 Coalbed methane is adsorbed to the surface of the porosity in coal macerals by the process of physical adsorption. The physical bond involved in adsorption of methane in coal is van der Waals' forces.

6.8 Adsorbed water also exists in coal. The physical bond involved in adsorption of water in coal is hydrogen bonding. This hydrogen bonding may be strong enough that some chemists, e.g., Douglas Smith, describe it as "chemisorbed water". However, hydrogen bonding never involves the sharing of electrons and, therefore, can never constitute a primary bond. Apparently, Dr. Smith uses the phrase to denote that adsorbed water may be strongly bonded in the coal.

6.9 Adsorbed coalbed methane does not behave as a free gas. Because of the increased concentration and pressure in a coal seam, the density of the methane in the coal may approach that of liquid methane.

6.10 Figure 17, Shinn model, shows the location of microporosity within the macromolecular structure of a coal maceral. The coloring shows that the microporosity is essentially the spaces between the structural units of the macromolecular structure of coal macerals. An essential feature of this microporosity is that no two micropores are likely to be identical. In one gram of coal there could as many as 10^{21} micropores. There will thus be a range of size, shape and energetics of adsorption. It is within these micropores that methane was formed and retained during the coalification process. It is within these micropores that methane is adsorbed.

6.11 An adsorbent and adsorbate are, by definition, different chemical compounds. However, adsorption creates a bonding system of which both the adsorbent and the adsorbate are constituents.

6.12 Both physical and chemical adsorption create systems of attachment or bonding. In each, the adsorbent and adsorbate are constituents of that system. It would

not make scientific sense to distinguish whether an adsorbate is a constiutent of such a system on the basis of whether the adsorption is chemical or physical. Likewise, it would not make scientific sense to distinguish whether an adsorbate is a constituent of such a system on the basis of whether the mechanism of attachment is hydrogen bonding or van der Waals' forces. The fallacy of such a distinction is illustrated by considering enthalpy of adsorption.

6.13 *Ethalpy (Heat) of Adsorption.*

6.13.1 Heat of adsorption, $(\triangle H)_a$, is defined as the heat (energy) liberated when one mole of an adsorbate (from a standard state) is adsorbed on an adsorbent. Units used are kcal mol^{-1}, or kJ mol^{-1} (1 kcal = 4.2 kJ. Values of $(\triangle H)_a$ vary (decrease) as the adsorbate progressively covers the surface of the adsorbate (θ = fraction of surface covered).

6.13.2 The experimental function used to differentiate between the bonding processes is the *heat of adsorption* $(\triangle H)_a$. If one examines values of $(\triangle H)_a$ for different systems it becomes apparent that an arbitrary distinction based on chemical vs. physical bonding or on hydrogen vs. van der Waals' forces does not make sense. In any given adsorption system, there exists a range of heats of adsorption, decreasing with increasing surface coverage. Heat of adsorption is a function of the adsorbate and the surface chemistry and porosity of the adsorbent. Making such an arbitrary distinction would have to mean that for adsorption giving $(\triangle H)_a > X$ kcal mol^{-1} then the adsorbate is part of the system: but for $(\triangle H)_a < X$ kcal mol^{-1}, the adsorbate is NOT part of the system. If such a distinction were applied across the field of adsorption chemistry, because of such wide variations and overlap in heats of adsorption system to system, then the application of this distinction would be totally arbitrary and without meaning.

6.14 There is no quantitative break-point as to where hydrogen-bonding ends and non-hydrogen-bonding begins.

6.15 Values of $(\triangle H)_a$ from the literature include:

System	$(\triangle H)_a$/Kcal mol^{-1}
n-Octane on a carbon	17
Water on Yallourn brown coal	15-10
n-Heptane on a carbon	15
n-Hexane on a carbon	13
Benzene on silica	12
n-Pentane on a carbon	10
Nitrogen on rutile	6
Methane on coal	5.3
Nitrogen on a carbon black	4-1.7

The above list indicates, most clearly, the wide range, 1.7 to 17 kcal mol^{-1}, of heats of adsorption for PHYSICAL ADSORPTION (all types of van der Waals' adsorption, section 5.4.6).

6.16 Hence, what *is* or *is not* part of coal cannot be decided, under any circumstances using comparisons of heats of adsorption or any other form of comparison of the energetics of the physical bonding process.

6.17 Desorption of coalbed methane from a coal seam is *not* a reversible process. One cannot put back into the coal anything close to the amount of the coalbed methane one can remove from the coal. However, in a laboratory environment, adsorption and desorption of methane on a coal sample are reversible processes.

6.18 Coalbed methane and water removed from coal, using current technologies, principally by drilling into the coal seam, reducing the pressure, and creating a pressure gradient toward a well bore. This is a physical process. However, many of the constituents of coal may be separated from the others using physical processes. For example, mineral matter may be washed out of coal. Water may evaporate from coal. Solid coal macerals may also

be separated from the coal by alterations in pressure and travel up a coalbed methane well bore. The fact that physical forces may be used to separate constituents of coal does not contribute to the debate as to whether or not a particular substance is part of coal. Rather, the debate must focus attention to the entire coalification process.

7. *Coal Utilization.*

7.1 There may be a present misconception among the lay public that coal is now, and has always been, a single purpose resource, i.e., that its sole use is to be burned as a solid fuel. In fact, for a large portion of the chemical industry from the mid-1800's, and was converted into a wide multi-purpose resource. For example, coal has been used as a source for fuel gas since the early 1800's. The technology has existed for sixty years to convert coal to liquid fuels. Coal tar was used as the raw material for a large portion of the chemical industry from the mid-1800's, to be were converted into a wide range of products, e.g., drugs, explosives, plastics, fibers, film, pesticides, paints, rubber, etc.

7.2 *Gas From Coal.* From about the 1880's until the mid-1960's, depending on the country being considered, a substantial percentage of coal was used for the production of coal-gas or town-gas . This gas was used for both lighting and heating. Like the coalification process, making gas from coal involves decreasing the amount of hydrogen and oxygen in the coal and increasing the percentage of carbon. The end product of carbonization/gasification processes is coke. Coke has a very high carbon content. As mentioned above, the theoretical end product of the coalification process is pure carbon in the form of graphite. Thus, the human generated activity of carbonization is similar in some respects to the geologic process of coalification only it occurs over a much shorter time period and at higher temperatures. Currently, about

10% ot coal production goes to carbonization ovens for the production of metallurgical coke for use in blast furnaces used in the iron and steel industry. The production of coke also produces coal-gas. This coal-gas is used as a fuel gas by the steel industry.

7.3 *Underground Gasification.* Underground gasification is the production of fuel gases from an underground coal seam using a combination of oxidation and carbonization processes. The technology involves igniting an underground coal seam, injecting steam, air or oxygen and withdrawing the fuel gases that are produced.

7.4 *Coal Liquefaction.* The macromolecular structures of coal, being aromatic in nature, depending on rank, are a potential source of liquid fuels, also aromatic in nature, e.g., gasoline. The straightforward carbonization of coal (heating in an inert atmosphere) produces liquid hydrocarbons which can be fractionated to give gasoline-like fractions. The United States explored coal liquefaction processes following the 1973 oil embargo. During World War Two, Germany produced its aviation gasoline from coal.

7.5 *Coal Tar.* A wide variety of liquids and gases can be produced from coal. Historically, coal tar has been used as the raw material from which a wide variety of products have been made. Today, distillates of coal tar are being used in a wide variety of advanced technologies. For example, coal-tar pitch is one substance resulting from the distillation of coal-tar. It is used in the production of carbon anodes for aluminum production, for graphite electrodes for steel production, and for a wide range of electrodes. Further, it is used in the fabrication of composites, with carbon fibers, and has several uses in the space industry.

7.6 Coal has been a multi-purpose resource for a very long time. The technologies of coal utilization continue to develop and diversify. Economic factors influence the

extent to which existing technologies of coal utilization are actually used and the rapidity with which new technologies of coal utilization are developed.

8. *Conclusions.*

8.1 Coalbed methane, being one of the several products of coalification, cannot logically be considered as being in any way different from the other products of coalification. Coalbed methane originated from the same materials from which coal macerals originated. Coalbed methane is located in the same place as coal macerals are located. Coalbed methane is found within the macromolecular structure of coal macerals. Coalbed methane is bonded to the macromolecular structure of coal macerals by the same physical process that binds water to the structure of coal macerals. Water is generally regarded as a structural component of coal.

8.2 Coal is a complex and heterogeneous substance. Coalbed methane is one of the substances that make up coal's heterogeneity.

FURTHER AFFIANT SAYETH NAUGHT

/s/ Harry Marsh
DR. HARRY MARSH

[Notary Omitted]

Hon. Thos. M. Carter,

St. Paul, Minn. Feb. 21, 1910.

Dear Sir:—

Permit me to call your attention to some matters of interest to your constituents concerning the U. S. Land Department with reference to lands in Montana. I write this at the request of numerous parties situated in Eastern Montana where it seems to us that the over-worked conservation schemes of U. S. Government is about to, if it has not already, swollowed a large portion of the best agricultural lands in the state of Montana by a report, purported to have been made last fall, wherein the Department has withdrawn from entry many thousands of acres on the most fertile lands in our state under a coal classification and it is reported that only 20-dollar coal filings will be accepted in the local land office, wherein such lands are situate. It seems to us and we know no reason why that the local land offices should not accept homestead filings or D. L. filings on these lands, subject to the reserve of the coal by the Government and also be permitted to go to final proof, with coal reserve. While I have not personally read the report from which this order was made, I understand that it was claimed by said report that the coal was not of any present commercial value, yet intimated that possibly it might be of value for gas away down in the remote ages. It is possible that the Department has made such orders pending a field examination of lands so classified but we of Montana are certainly getting very tired of the long-drawn out red-tape actions delaying the immediate settlement of our State and feel to insist that some relief from such wholesale grabbing of our public domain from the thousands of Entrymen, looking to Montana for homesteads and we generally expect the greatest immigration into the state this year ever witnessed but if you will get from the Land Department, its latest map of Montana showing the coloring of coal lands, withdrawn from entry, pending some further examination etc., you will be surprised, while in

addition to that I enclose a clipping wherein there has been a recent order made which withdraws high entry pending field examination for coal *60,000 acres in Montana. (Enclosed clipping). The people generally believe in conservation but it seems to tie up by one order or another from the Department at Washington the best of our lands pending an examination which means untold delays. The people generally feel that the Government with its forest reserves, well, the blue coloring on the new map will speak volumes to you. These delays on the part of the Government, you are certainly aware will during the present year be the means of sending thousands of people into Canada where homes can be obtained more readily.

I especially request of you to look up, if convenient, and find where the trouble lies with reference to the U. S. Survey made in Fall of 1907 for township 27 E. of R. 53 E., M.P.M. The plats of said survey have not as yet been turned into the local Land Office. There are many settlers, and in fact all the available land, suitable for agriculture in this township would be promptly filed on, were the plats filed and land opened for filing. About three and half years since survey was made. In calling your attention to the above matters, I do so as your personal friend having known you and lived in Montana since '86, hoping that you can find time, to kindly let me hear from you that I may make it plain to inquiring settlers in my community. With best wishes, I am Most truly your friend,

/s/ John H. Simpson
Formally of Butte but now
of Brocton, Montana.